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CARCINOMA OF THE THYROID

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CARCINOMA of the thyroid is one of the least stressed forms of carcinoma. This is due, in the first place, to the rarity of the condition, cancer of the thyroid comprising 2 or 3 per cent of goiters, and in the second place, to an early misconception of the hopelessness of the situation after the disease has occurred. On the other hand, since cancer of the thyroid usually arises in an adenoma, the prophylactic removal of these should prevent most cancers of this organ. Moreover, this type of carcinoma offers an excellent chance of control or even possible cure after malignant change has occurred.

While the knowledge that most carcinomas of the thyroid originate in discrete adenomas has been repeatedly stressed and is appreciated by a great many physicians, Lahey¹ states there are still a number who either do not realize the possibilities of prevention of cancer of the thyroid by removal of these adenomas before they become malignant, or are not so impressively convinced of the danger that they are willing to advise early prophylactic removal of these tumors. The surgeon is still too often confronted with the stock answer of patients with long standing discrete tumors of the thyroid, "My doctor told me that as long as it was not bothering me to leave it alone."

The age incidence of thyroid malignancy is another point which is frequently misunderstood. In going over large series of cases we find an increasing number of malignancies occurring in younger people between the ages of 25 and 30: we are beginning more and more to realize that carcinoma of the thyroid is not a disease confined exclusively to older individuals. We are also learning that the size of the discrete tumor in the gland is no indication as to the probability of malignancy, the smaller tumors being as prone to malignant change as the larger.

The difficulty of preoperative clinical diagnosis of malignancy of the thyroid is another point stressing the importance of prophylactic prevention of this disease: In a large number of cases it is impossible to make a definite diagnosis without biopsy and the disease is frequently not recognized even at operation. The disease with which malignancy is most frequently confused is thyroiditis. This cannot always be ruled out but the history of a painful diffuse swelling of the gland in which the contour is still maintained will usually be of value in differential diagnosis. The association of enlarged indurated cervical lymph nodes with any hard indurated gland should make one very suspicious of malignancy.

A feature strongly indicating possible malignant degeneration of an adenoma of the thyroid is a change from moderate firmness to one of induration. The most common cause of changes in consistency of adenomas are malignancy and hemorrhage into the tumor. The former occurs gradually, while the latter usually occurs rapidly and with some localized pain and tenderness. Fixation of an otherwise movable tumor, with loss of outline of a discrete adenoma and invasion of the parenchyma of the gland are also important signs of malignancy. Hemorrhage may also cause these but the reaction is less marked and to some extent clears up over a short period of time.

From a pathologic standpoint Lahey¹ has divided thyroid malignancies according to the degree of malignancy:

GROUP I Low malignancy

1. Adenoma with blood vessel invasion
2. Papillary cystadenoma

GROUP II Moderate malignancy

1. Papillary adenocarcinoma
2. Alveolar adenocarcinoma
3. Hurthle cell carcinoma

GROUP III High malignancy

1. Small cell carcinoma
2. Giant cell carcinoma
3. Epidermoid carcinoma

Epidermoid carcinoma, the type of case which follows, is the rarest type of cancer of the thyroid. Pemberton,² in 517 reported malignant tumors of the thyroid from The Mayo Clinic, reports only 4 cases, or 0.8 per cent of all malignancies of the thyroid. Most other writers (Smith, Pool and Olcott,³ Clute and Warren,⁴ Lahey, Hare and Warren¹), usually quote only single observations.

All of the writers include epidermoid carcinoma under the hopelessly malignant class of carcinoma, most patients dying in less

than a year and not being amenable to roentgen ray or radium treatment. My patient lived three years after operation, died from a cerebral hemorrhage, without developing any demonstrable metastasis.



Fig. 1. Epidermoid Carcinoma infiltrating gland. Degenerating tissue of abscess to the right. 80x.

The disease occurs at any age, most cases reported however being from 50 to 65 years of age, although Schmidtman⁵ has reported one case in a boy 10 years of age which she traced to the branchial arches.

The symptoms of the disease are few in number and the onset usually rapid. The patient usually notices first a mass in the region of the thyroid which is rapid in growth, becomes increasingly hard, firm and fixed and eventually interferes either with respiration or deglutition. The whole process usually takes place over a period of three months to a year.

There has been considerable dissension in regard to the origin of this type of tumor in the thyroid gland. Some writers contend that from the embryonic development of the gland it is impossible for squamous epithelium to develop in the thyroid. Therefore, that these tumors always arise either from structures outside the gland, such as the larynx or branchial clefts, and are direct extensions into the thyroid, or that they arise in remnants of vestigial organs within the gland, such as remnants of the thyroglossal duct or fetal rests.

On the other hand, most writers at the present time agree that it is possible for metaplasia of the thyroid epithelium to squamous epithelium to take place within the gland. Jaffe,⁶ Broders,⁷ Ewing⁸ and others are very insistent on this point.

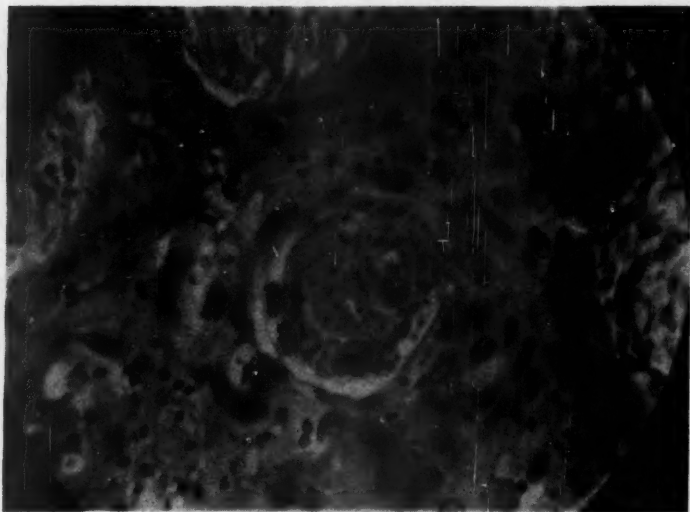


Fig. 2. Higher magnification: 200x, showing attempted epithelial perle formation.

Jaffe⁶ reports three cases and sets forth two conditions in which metaplasia occurs: 1. Sclerosis of the gland with degeneration of the thyroid epithelium followed by regeneration and laying down of squamous epithelium. 2. Abscess formation in the gland with regeneration and formation of squamous epithelium within the thyroid follicle from thyroid epithelium.

The following case seems to me to combine both of the above since there was both sclerosis of the gland and abscess formation with subsequent epidermoid carcinoma.

REPORT OF CASE

A woman, aged 62, was first seen with a small mass in the left upper lobe of the thyroid. This was found on a routine examination by her physician (her complaint at this time being high blood pressure and hardening of the arteries). Physical examination otherwise, except for hypertension and arteriosclerosis, was negative.

During treatment for hypertension her physician noticed that the mass in the thyroid was growing rapidly and was becoming increasingly hard and fixed. The patient at this time also began to complain of difficulty in breathing and swallowing. Operation was advised.

At operation a mass about 4 by 4 cm. was found in the left upper lobe of the thyroid. This was extremely hard, almost stone-like, in consistency. There was considerable fibrosis of the gland and attachment to the capsule. Therefore, the entire lobe with as much of the capsule as possible was removed. No laryngeal or branchial cleft origin was found for this tumor.



Fig. 3. Epidermoid Carcinoma at lower part. A few remaining thyroid follicles. 80x.

Gross section of the gland showed marked fibrosis in the lower part of the lobe with a walled-off pocket-like abscess in the upper part of the lobe. The wall of this abscess was extremely hard and brittle and appeared to contain calcium deposits. The pus in the abscess was found to be sterile.

On microscopic examination, sections of the gland taken near this abscess showed invasion of epidermoid carcinoma, while the lower part of the gland showed a marked sclerosis and degeneration of the thyroid follicles, with considerable fibrous tissue infiltration.

The patient made an uneventful recovery and was given heavy doses of deep x-ray therapy. At no time were any demonstrable metastases noted to lungs, bone or regional lymph nodes. She remained in relatively good health except for her hypertension for three years, dying after this period of time from a cerebral hemorrhage. Unfortunately, it was impossible to secure permission for an autopsy.

I believe that this case simulates rather well the conditions laid down by Jaffe for metaplasia of the thyroid epithelium into epidermoid type, since there was both abscess formation and sclerosis in this gland.

Treatment of thyroid malignancy is radiation combined with surgery. The result of this combined treatment is very satisfactory.

Five year survival ratio varies from 80 per cent in the lower grades of malignancies to 17 per cent in the extremely malignant types of tumors. In no group of cases is surgical judgment more important. A biopsy is of prime importance to determine the radio sensitivity of the type of tumor and to decide whether it will be best to undertake radiation alone or radiation plus complete removal of the tumor. A large number of cases which at first appear inoperable may become operable after radiation. Where complete removal of the thyroid gland is performed postoperative radiation is also of prime importance.

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COD LIVER OIL THERAPY OF WOUNDS AND BURNS*

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INTRODUCED by Lohr¹ in 1934, the local use of cod liver oil as a wound dressing, applied alone or in ointment form, is now widely accepted by European clinicians as a therapeutic procedure of proven worth. Based on extensive experimental and clinical studies, over one hundred foreign publications attest the admirable results secured with this method in the treatment of burns and both clean and infected wounds of many types. Within recent years approximately twenty-five papers have appeared in the American literature. But the cod liver oil method has attracted comparatively little attention in this country.

For over five years I have employed cod liver oil as a wound dressing in an increasing variety of surgical conditions. The results have been so generally gratifying that the method would seem to merit wider recognition by American surgeons. Experiences with a small group of cases have been previously reported². Observations on the cod liver oil treatment of 346 cases of assorted wounds and burns at the Ellen Fitzgerald Hospital form the basis for the present paper.

REVIEW OF THE LITERATURE

In numerous reports Lohr³⁻¹² has recorded unusual success in treating several thousand cases of burns, ulcers, osteomyelitis, various clean and infected wounds, and pyogenic skin infections using an ointment of crude cod liver oil and petrolatum (unguentolan) and plaster casts. Lohr's claims were soon widely confirmed abroad. Steel¹³ treated burns and wounds with crude cod liver oil dressings and was so impressed with the rapid healing and almost total elimination of scar tissue that he gave up tannic acid for burns and used the oil routinely. Tennent¹⁴, Zuelzer¹⁵, Zoltan¹⁶, Horn and Sandor¹⁷, Sandor¹⁸, Lauber and Rocholl¹⁹, Seiring²⁰, Strauss²¹, Ritter²², Daver²³, Chatterjee²⁴, Herlyn²⁵, Jencio²⁶, and other early investigators have extolled the cod liver oil method for wounds and burns. Stevenson²⁷ showed that the oil is ideal for burns of the cornea, eye, and lids. Hare²⁸ acclaimed it for scalds, and Durand²⁹ for frostbites. Wartmann³⁰, and Borovskaya³¹ reported its successful use in certain dermatologic conditions. Though Lucke³² and Buchheister³³ preferred the oil mixed with honey, most of these authors used an oint-

*Editor's Note: This paper was published in the May, 1941, issue of *THE SOUTHERN SURGEON*. There has been so much interest in the paper, as evidenced by many requests for reprints, reproductions and abstracts by other publications, it is thought advisable to reproduce it in *THE SOUTHERN SURGEON* at this time.

*In active Military Service.

ment of cod liver oil and petrolatum, while others employed the oil alone, with or without casts.

In this country the external use of cod liver oil has been favorably reviewed in a comprehensive article by Holmes³⁴. Puestow, Poncher, and Hammatt³⁵ performed controlled experiments proving that burns in pigs and rabbits healed 25 per cent faster under cod liver oil than with tannic acid. Berlin and Davis³⁶ enthusiastically recommended 60 per cent cod liver oil-vaseline ointment and plaster bandages for major burns. Meherin and Schomaker³⁷ praised the oil for cement burns. Kanzanjian³⁸, Aldrich³⁹, and MacCollum⁴⁰ advised its use for indolent granulations. Wright⁴¹ reported success in treating osteomyelitis and compound fractures with cod liver oil and zinc peroxide. Salzman and Goldstein⁴² obtained rapid healing of suppurative cutaneous wounds and ulcerations with "Codalltoin," an ointment containing 45 per cent cod liver oil and 2 per cent allantoin. Driver, Binkley, and Sullivan⁴³ secured superlative results in 25 cases of indolent ulcers treated with an ointment of 88 per cent cod liver oil and 12 per cent white wax. Banyai⁴⁴, reporting successful local application of cod liver oil in tuberculous laryngeal ulcers, noted healing of the ulcers and recovery from pulmonary tuberculosis in a notably high percentage of cases. Brandaleone⁴⁵ treated chronic diabetic ulcers of the feet with topically applied cod liver oil. Early healing occurred in all but one of 21 treated cases, resulting from rapid increase of epithelial tissue. Infection was reduced and results in the cod liver oil treated cases were markedly superior to those in the controls.

ADVANTAGES OF COD LIVER OIL AS A WOUND DRESSING.

Certain properties impart to cod liver oil a unique effectiveness as a wound dressing. The oil is sterile and bactericidal. Lohr⁴⁶ found that it readily destroys staphylococci, streptococci, *B. coli*, and even tubercle bacilli. Tumanskiy and Jacevitch⁴⁷ showed that streptococci and staphylococci cease growing in unsterilized cod liver oil in one hour and six hours respectively, whereas these same organisms grow for fifteen days in sterile petrolatum. Iost and Kochergin⁴⁸ proved that the oil lowers the vitality of pyogenic bacteria. Lichtenstein⁴⁹ demonstrated its bactericidal effect experimentally. Dri-galski⁵⁰ showed that it inhibits the growth of gas and spore-forming organisms.

Of primary importance is its stimulating effect on granulations and epithelization. This results in a remarkable regeneration of all sorts of tissue defects. Its influence is at times dramatic. Wounds fill more quickly with granulations, epithelize more satisfactorily, and heal more rapidly than with other methods. It is particularly

effective in unhealthy wounds which have not progressed under previous therapy. Old infected third degree burns, varicose, decubitus, or other long-standing ulcers, and chronically infected wounds may be transformed quickly into renewed activity and heal with surprising rapidity.

The oil produces not merely a local response but also a beneficial generalized systemic effect. In a large series of controlled experiments on the healing of tuberculous ulcers in guinea pigs, Getz⁵¹ showed that not only did the ulcers in the cod liver oil treated animals always heal faster, and with remarkably little scarring, but the treated pigs showed less generalized tuberculosis than did the controls. Tuna and halibut liver oils produced no favorable systemic effect. Similar tests proved paraffine, lanum, olive, and cottonseed oils to be ineffective.

Cod liver oil dressings accelerate the liquefaction of dead tissue in the presence of pus and markedly reduce the toxicity of pus, as proved in animal experiments by Kummel and Jensen⁵². The surface of the wound is cleared; the medium on which bacteria thrive is thus removed, with obvious benefit in the case of burns and infected wounds. Traxl⁵³ also showed that the oil increases the metabolic rate of leukocytes by 420 per cent.

The oil forms a protective non-irritating layer over the wound, as emphasized by Lohr⁵⁴⁻⁵⁵, and Schaer⁵⁴, guarding it from injury when dressings are changed. Separation occurs between the oily layers and not between the wound surface and the gauze which is so often found adherent with other dressings. Similarly, I have observed that the tendency of granulations to bleed excessively in changing dressings is minimized by the use of cod liver oil. Loss of much-needed blood is thus prevented in chronic cases such as extensive burn ulcerations so often associated with severe anemia. These benefits are augmented by the employment of plaster or infrequent dressings.

The oil dressings are painless and eliminate the agony associated with dressing these terrible wounds. The patient's apprehension disappears; general improvement results.

Lastly, cod liver oil dressings produce minimal scarring as proved experimentally and confirmed by countless clinical observations including my own.

THE ROLE OF VITAMINS IN THE COD LIVER OIL EFFECT.

The explanation of the local stimulating effect of cod liver oil on granulations and epithelization as due to the vitamin A and D content of the oil is now generally accepted. It has long been recog-

nized that vitamin A administered orally exerts a protective and stimulating regenerative effect on epithelium. More recently it has been shown that adequate amounts of oral vitamin C are essential for wound healing. Lauber⁵⁵, and Lundh⁵⁶ proved conclusively "that vitamins A and D were absorbed through the surface of the wound into general circulation and then exerted a beneficial action on the whole organism." Lauber⁵⁷ cites extensive experiments indicating that vitamins A and D have a local growth-promoting and stimulating action on connective tissue and epithelial cells. The experiments of Drigalski⁵⁸ indicated that cod liver oil ointment hastens healing in skin wounds of guinea pigs more rapidly than vitamin-free ointments; he thought this was due to vitamin A. Proto⁵⁹, studying the action of vitamins on the healing of wounds in rabbits, concluded that the healing process is not modified by local administration of vitamin C, that it is slightly modified by vitamins A and D given orally, but that "it is greatly and favorably modified by local application of these vitamins to the wounds, especially A. The time of healing is greatly lessened, and the condition of the wounds is much better than in the controls." Lohr and Treusch⁶⁰, and Hayashi⁶⁰ also believe the vitamin A and D content of the oil are both important. Independently, both Lohr and Unger⁶¹, and Getz⁶¹ showed that the active stimulating agent is concentrated in the non-saponifiable fraction of cod liver oil which contains vitamins A and D, also iodine and numerous unknown substances. Getz⁶¹ showed that it is not alone vitamin A nor vitamin D but the combination of both present in the proportion found in cod liver oil which is responsible for the stimulating effect. This explains why Dykes⁶², Puestow⁶⁰, and others have found cod liver oil definitely superior to halibut and other fish liver oils in the treatment of wounds, since these oils contain vitamins A and D in proportions differing from those in cod liver oil. McLaughlin⁶³ sums up the matter well in stating that vitamin A appears essential for the growth of epithelial cells; that vitamin D is probably not essential and not sufficient to support epithelial growth by itself; but that vitamin D is a powerful stimulant to cell growth in the presence of vitamin A.

INDICATIONS

The cod liver oil method is not merely the employment of a supposedly magical oil as a wound dressing. It is rather, in my hands, a complete plan whereby all possible tissue is preserved, infection minimized, granulation stimulated, and healing accelerated by the physiologic principles of closed antiseptic dressing, rest, and avoidance of disturbance of granulations.

I have found cod liver oil therapy especially applicable to extensive crushing or destructive injuries—where more tissue can be pre-

served—and to compound fractures, gunshot wounds, open amputation stumps, abscess cavities, large infected wounds, major primary burns, and extensive ulcerations from deep third degree burns or other causes; in short, to any injury with loss of tissue in which immediate surgical closure is not feasible.

TYPES OF CASES IN SERIES OF 346 WOUNDS AND BURNS TREATED WITH COD LIVER OIL.

This series of 346 wounds and burns treated with cod liver oil is summarized in Table 1.

TABLE 1

22	primary major burns
1	deep destructive multiple electrical burn
39	minor burns
25	amputation stumps: 2 femur, 4 tibia and fibula, 2 humerus, 2 radius and ulna, 5 metacarpal or metatarsal, 11 phalanx
19	compound fractures: 1 tibia, 1 fibula, 1 os calcis, 1 ilium, 5 metacarpal or metatarsal, 10 phalanx
1	extensive multiple compound fracture of skull
16	very large ulcerating areas: 5 old burns, 3 chronic undermining burrowing ulcers, 8 extensive decubitus and miscellaneous ulcers
2	ruptured infected eviscerating abdominal wounds
18	deep wounds: penetrating, gunshot, postoperative, or abscess cavity
20	draining or infected abdominal wounds
12	varicose or chronic leg ulcers
3	acute osteomyelitis: 1 tibia, 2 phalanx
3	chronic osteomyelitis: 1 metatarsal, 2 phalanx
1	severe avulsion of entire skin of penis (to be reported)
84	assorted clean open wounds
79	assorted infected wounds and abscesses

346 Total Cases.

COD LIVER OIL TREATMENT OF WOUNDS

Thus in clean fresh cases the surrounding parts and then the wound itself are thoroughly cleansed by sterile soap and water scrubbing for at least ten minutes. No antiseptic is employed in the wound. Scrupulous but conservative debridement is carried out. All viable tissue is saved. Compound fractures are reduced if present. Plastic repair is accomplished where possible. Suture is done wherever indicated. The remaining open wound is then filled with cod liver oil ointment applied on gauze to all crevices to allow free drainage. In compound fractures the extremity is immobilized in a carefully applied plaster cast which is usually not changed and the wound not disturbed for several weeks. In soft tissue injuries without fracture or in compound fractures of the hand or fingers plaster

may be omitted and the parts otherwise immobilized after a dry gauze pressure dressing has been snugly applied to the ointment-filled wound. Plaster applied to soft tissue wounds without fracture is changed after about 14 days. When casts are omitted, such wounds are dressed every 3 to 14 days. In any case local sulfanilamide therapy may be employed along with the cod liver oil ointment when indicated.

My conception of the cod liver oil treatment of wounds thus closely resembles Orr's^{64, 65} closed petrolatum treatment of osteomyelitis and compound fractures, and the modern closed plaster treatment of war wounds described by Trueta^{66, 67} and so successfully employed in the present European war. Orr packs the wound with strips of sterile petrolatum gauze. Trueta employs dry gauze packing. In the cod liver oil method the wound is packed with gauze saturated with cod liver oil ointment.

Since cod liver oil possesses the previously mentioned inherent advantages as a wound dressing not found in petrolatum or dry gauze, the cod liver oil method should theoretically be superior to these other closed methods of wound treatment. I believe that the substitution of cod liver oil ointment for the petrolatum and dry gauze packing now used in the methods of Orr and Trueta respectively will result in superior healing. In order to evaluate the Orr and Lohr methods in treating chronic osteomyelitis, Dengler⁶⁸, in 1936, treated 23 cases by Orr's method and compared results with 15 cases using Lohr's cod liver oil. While results with both methods were gratifying, cod liver oil gave superior results: "The wounds healed more quickly and left less conspicuous scars." It is also emphasized that the cod liver oil method is especially useful in soft tissue injuries without complicating fractures.

In treating chronic leg ulcers cod liver oil ointment is applied locally followed by a generous covering of dry gauze. An elastic pressure dressing is then fixed in place after the manner of the "venous heart," and the entire limb firmly bound with an Ace bandage. Thus optimum healing is secured by combining mechanical stimulation of the circulation with the cod liver oil effect.

Closed methods of treatment have proved effective in preventing the development of gas gangrene. But cod liver oil therapy should be used with judgment in badly contaminated wounds, and is not immediately applicable to acute inflammatory lesions. Here the usual surgical measures of incision and drainage, sulfonamide therapy, and especially hot moist sterile saline compresses for a few days are indicated to overcome acute infection. After this preliminary treatment cod liver oil therapy is applied as in clean cases and

is unusually effective in cleaning up the infected wound or abscess cavity. Sloughs separate quickly; purulent drainage soon disappears; and healthy granulations develop rapidly. So successful indeed is the cod liver oil treatment of infected wounds that during the past five years I have found it unnecessary to apply the Carrel-Dakin treatment to any wound. Cod liver oil ointment combined occasionally with the judicious use of hot saline compresses now supplants Dakin's irrigations.

COD LIVER OIL TREATMENT OF BURNS

Before discussing the cod liver oil treatment of burns a brief review of burn pathologic physiology may be given.

Shock and early toxemia account for 80 per cent of burn deaths. Most delayed fatalities result from sepsis. Local treatment should not be given in the presence of shock, since these early deaths are not favorably influenced by any type of dressing applied to the burn. The fundamental lesion in burn shock is increased capillary permeability at the site of the burn resulting in loss of plasma fluids, hemoconcentration, slowed capillary blood flow, and tissue anoxemia. This produces shock, irreversible tissue changes, and death unless vigorously combated. The important factor in early burn therapy is, therefore, not the attempt to seal the burn and prevent external fluid loss by applying tannic acid or some other coagulant to the burned area, but rather the maintenance of adequate blood volume through prompt replacement of lost protein and fluid by early and repeated plasma transfusions combined with warmth, sedation, position, and other accepted shock treatment. Parenteral saline is not indicated, but glucose may be given to protect the liver. Whole blood transfusions should be used at this stage only when plasma is not available. Plasma requirements are best determined by frequent hemoglobin readings. These gauge the progress of shock earlier and more accurately than does the subsequent fall of blood pressure.

Since the popularization of tannic acid and its modifications, it is often stated that greases and oils are contraindicated in burns because they fail to "seal" the damaged tissues. But according to Clayton⁶⁹, cod liver oil differs from other fats and oils in that coagulation in the form of an elastic membrane occurs instantly when the oil comes in contact with the body tissues at the burned area. There is thus a physico-chemical parallelism between the tannic acid treatment and the oil treatment. Tannic acid forms a hard adherent eschar by mutual precipitation of colloids from their aqueous environments, while the oil forms a pliable elastic membrane by interfacial precipitation. This probably accounts for the minimal cicatrization produced by cod liver oil.

In comparing local cod liver oil treatment of serious major burns with the use of tannic acid or other coagulant methods it must not be objected, therefore, that the oil is less effective than a coagulum in sealing the burn and preventing vital fluid loss. The relatively slight external fluid loss which may be prevented by a coagulum is unimportant compared to the tremendous diffusion of plasma into the surrounding tissues which is unaffected by any local dressing and for which plasma transfusions offer an ideal remedy. Furthermore, fluid diffusion in extensive burns is minimized by covering the burn with vaseline gauze and applying a large dry gauze pressure dressing similar to that employed in skin grafting, as recently demonstrated by Allen⁷⁰, and by Noland and Wilson⁷¹; or by using Lohr's plaster bandages. Substituting cod liver oil ointment for vaseline, this is essentially the cod liver oil method. The factor of fluid loss may thus be ignored in evaluating the oil for burns.

My experience confirms Lohr's^{1, 3} finding that cod liver oil does not influence shock but is unusually effective in controlling infection. The early saving of life is not dependent on the type of local dressing, but on adequate treatment of shock. Delayed deaths from sepsis, however, are definitely reduced by substituting the cod liver oil method for local coagulant therapy.

This is especially evident in extensive third degree burns. These are the cases which so often develop infection beneath the crust, whether coagulated by tannic acid, silver nitrate, gentian violet, aniline dyes, or some combination of these methods. Coagulant treatment satisfactorily heals the more superficial first and second degree areas. But in deep third degree burns, the coagulum fails either to heal or to prevent infection. Whether clean or infected, these deeper burns heal faster with cod liver oil therapy. Should acute infection develop, it is easily controlled by saline baths or compresses for a few days, after which the oil will soon produce clean healthy granulations. Under cod liver oil, deep burns are recognized early and, between two and three weeks after the accident, are either healing well or ready for skin grafting.

Coagulant methods often require weeks longer to secure a similar result. Deep burns may long remain unrecognized until removal of the crust. Stubborn infection under the eschar may be very resistant when discovered. Worse still, the adherent coagulum must often be removed from unhealed third degree areas either by soaking, which may increase toxemia, or by surgical excision, sometimes under general anesthesia. Excision of the crust, no matter how carefully performed, injures surviving deep epithelial elements, frequently annihilates them, thus prevents healing except from the periphery and increases the necessity for skin grafting.

Cod liver oil reduces infection, forms no adherent coagulum, destroys no epithelial elements, minimizes skin grafting. In 122 cases of severe second and third degree burns thus treated by Lohr³ no skin grafting was required; and Lohr³ did not once resort to skin grafting in the cod liver oil treatment of burns over a three and one-half year period. Though I can not confirm such amazing results and feel strongly that skin grafting should be employed early whenever indicated, my experience strengthens the belief that cod liver oil minimizes skin grafting in burns.

For chronic unhealing deep burn ulcerations, whether clean or infected, the cod liver oil method offers unsurpassed advantages. Severe infection may require saline baths or compresses for several days, but will often respond readily to cod liver oil ointment. Once acute infection is controlled, it is in these serious cases that the protective and stimulating properties inherent only in cod liver oil become more manifest. I know no other treatment so effective as the cod liver oil method in dealing with these desperate cases of deep widespread burn ulceration.

Because of its constricting effect tannic acid should not be used on the hands or feet. Nor is it satisfactory on the face, perineum, or in the axilla or groin. For all burns in these locations cod liver oil is the treatment of choice.

TECHNIC FOR BURNS

From admission every severe burn should be treated as a large open wound. Infection must be prevented. No effort should be spared to keep bacteria out of the wound. During shock treatment protection should be afforded by sterile sheets. At the earliest moment when shock is controlled light debridement is carried out, under general anesthesia if necessary. Hands should be scrubbed. Sterile gloves and gown should be worn. Caps and masks must be used by all who enter the room during debridement. The burn is thoroughly cleansed with sterile soap and water, flushed with saline, and dried. All blisters are opened. Dead skin is excised. A thick layer of cod liver oil ointment is applied to the burned area on fine meshed gauze followed by a dry gauze dressing. Either a cast is employed or the part is encased in a heavy pressure gauze dressing, and immobilized. The cast may be left undisturbed for 14 days or longer. When plaster is not used the burn is dressed every 3 to 14 days. The ointment melts and the oil thoroughly permeates all necrotic tissues. The toxicity of the organisms is reduced if not actually destroyed by the oil. At first there is tremendous activity with massive secretion of pus which soon leads to separation of all necrotic material. Early demarcation occurs between the dead tissue

TABLE 2

Analysis of Results in 22 Major Burns Treated with Cod Liver Oil

Name	Age	Per cent of body burned	Degree of burns	Other prev. treatm't.	Infec.	Skin graft	Result.	Scarring
L. R.	83	17	2 & 3	No	No	No	Well.	Minimal.
G. N.	35	16	2 & 3	No	Yes	No	Well.	Keloid (Tbc).
E. Y.	20	12	1, 2, 3	No	Yes	No	Well.	Minimal.
B. R.	2	26	2 & 3	No	No	No	Well.	Moderate.
E. Y.	18	29	2 & 3	Yes	Yes	No	Well.	Moderate.
S. R.	22	13	2	No	No	No	Well.	Minimal.
M. G.	4	21	3	Yes	Yes	Yes	Well.	Minimal.
L. K.	47	14	3	Yes	No	Yes	Well.	Moderate.
M. M.	23	13	1, 2, 3	No	No	No	Well.	Minimal.
J. D.	44	12	2 & 3	No	No	?	Recovering (3 weeks).	
H. C.	23	27	3	Yes	Yes	Yes	Recovering (7 weeks).	
M. W.	8	18	1, 2, 3	No	Yes	Yes	Recovering (11 weeks).	
W. M.	13	62	2 & 3	No	No	?	Recovering (3 months).	

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21.5% equals average per cent of body burned in 13 worst major cases.

E. R.	18	7	3	Yes	Yes	Yes	Well.	Minimal.
J. B.	14	6	2 & 3	No	No	No	Well.	Minimal.
K. H.	41	5	2 & 3	Yes	No	No	Well.	Minimal.
J. M.	16	3	3	No	No	Yes	Well.	Moderate.
S. T.	23	5	2 & 3	No	No	No	Well.	Minimal.
J. C.	31	5	3	No	No	No	Well.	Minimal.
J. D.	47	6	2 & 3	No	No	No	Well.	Minimal.
J. G.	26	3	3	Yes	Yes	Yes	Well.	Minimal.
L. L.	13	5	2 & 3	No	No	No	Well.	Minimal.

—
14.8% equals average per cent of body burned in total 22 major cases.

Total major cases given other local therapy previous to cod liver oil.....	7
Total such cases which later developed infection.....	5
Total major cases originally treated with cod liver oil.....	15
Total such cases which later developed infection.....	3

and the healthy fresh granulations which develop underneath with surprising rapidity. After all sloughs have separated, secretion is much reduced, and dressings may be changed less frequently. Whenever indicated, skin grafting should be done without delay.

Tables 2 and 3 summarize my experience in the cod liver oil treatment of 62 cases of burns. On the basis of results secured in 22 cases of serious major burns averaging 14.8 per cent of body surface involved and 39 minor burns plus one deep electrical burn

TABLE 3

Ellen Fitzgerald Hospital Burn Mortality
Jan. 1, 1937 to March 1, 1941.

Total major burns treated with cod liver oil.....	22 Cases.
Total minor burns treated with cod liver oil.....	39 Cases.
Total deep electrical burns treated with cod liver oil.....	1 Case.
Total number of burn cases in cod liver oil series.....	62 Cases.
Mortality—0%	

I believe that cod liver oil offers an effective therapy applicable to the most severe burns of all types and superior to other methods of treatment.

During the four year period in which these 62 burn cases were treated with cod liver oil, 5 other patients were admitted who promptly died of shock. One of these was treated locally with tannic acid; one with tannic acid-silver nitrate; three received no local treatment. Note: All five fatalities occurred before the establishment of our hospital blood and plasma bank.

Analysis of 5 Fatal Burn Cases.

Name	Age	Per cent of body surface burned	Time between burn and admission	Shock on admission.	Local therapy used on burned area.	Hours patient lived after admission.
W. B.	35	82	1 hour	Severe	Tannic acid	35 hours
E. O.	58	43	1 hour	Severe	None	14 hours
W. S.	41	52	$\frac{1}{2}$ hour	Severe	None	10 hours
E. T.	51	80	3 hours	Severe	None	2 hours
F. R.	3	40	7 hours	Severe	Tannic-AgNo3	9 hours

59% equals average body surface burned in 5 fatal cases.

Note: This table suggests that local therapy does not influence fatal shock; 5 deaths in total of 67 burns treated in past 4 years equals mortality of 7.4%.

COD LIVER OIL PREPARATIONS

Rarely is pure liquid cod liver oil applied alone. It is usually more conveniently combined with petrolatum or some other base to form an ointment which has more body. Lohr used an ointment of crude cod liver oil and petrolatum. In this country pure commercial rather than crude cod liver oil has been used. This is produced by chilling out the stearin and certain other fats from the crude oil, and filtering. The many available grades of commercial oil vary greatly in vitamin content. U.S.P. cod liver oil has a minimum requirement of 24,200 units of vitamin A and 2,420 units of vitamin D per ounce. Only oils of at least this potency should be used.

Table 4 lists the vitamin potencies of a few commercial oils in percentages as compared with that of U.S.P. oil. Also shown are the vitamin percentages of "home made" 50 per cent cod liver oil-vaseline ointments prepared from these various oils, and their approximate costs. The oil itself should not be sterilized since heat destroys the vitamins. It is thoroughly mixed with autoclaved petrolatum in the proportion desired. The resultant ointment is ready for use and should be kept in dark containers.

This home-made ointment composed either of 50 to 80 per cent U.S.P. or high potency cod liver oil and petrolatum was used ex-

TABLE 4

"Home Made" Cod Liver Oil Ointments.

Preparation	Vitamin Units Per Ounce	Per Cent U.S.P. Cod Liver Oil Content	Ointment Base	Approx. Cost per lb. (Retail).
U.S.P. Cod Liver Oil	24,200 A.	100%	None	\$0.90
50% U.S.P. Cod Liver Oil— Petrolatum Ointment	2,420 D. 12,100 A.	50%	Petrolatum	\$0.60
McKesson Cod Liver Oil (High Potency)	1,210 D. 70,875 A.	290%	None	\$1.50
50% McKesson Cod Liver Oil —Petrolatum Ointment	7,087 D. 35,437 A.	145%	Petrolatum	\$0.90
Meads Cod Liver Oil (High Potency)	3,543 D. 51,130 A.	210%	None	\$1.50
50% Meads Cod Liver Oil— Petrolatum Ointment	4,960 D. 25,515 A.	105%	Petrolatum	\$0.90
Squibb Cod Liver Oil (High Potency)	2,480 D. 51,130 A.	210%	None	\$1.50
50% Squibb Cod Liver Oil— Petrolatum Ointment	7,371 D. 25,515 A. 3,685 D.	105%	Petrolatum	\$0.90

clusively during the first four years of my studies with almost universally satisfactory results. During the past year, however, six different leading commercially manufactured cod liver oil ointments have been studied in an attempt to evaluate them clinically in comparison with each other and with home-made cod liver oil-vaseline ointments. These are listed in Table 5 for comparison with the various home-made ointments.

It has not been possible to distinguish clinically between the therapeutic activity of these various commercial ointments. All are effective. But commercial preparations appear definitely superior to home-made ointments. All are elegant preparations. Each has a pleasing odor, a genuine advantage over the fish odor of home-made ointments. All the commercial ointments keep indefinitely at room temperature. None becomes rancid as does the home-made ointment. They cost a little more, but are worth it.

Each of these commercial ointments has its own special ointment base; and each has certain advantages. It appears probable that those ointments reputedly possessing the higher vitamin potencies as listed are somewhat more effective than those whose vitamin potency is less than that of U.S.P. oil. Excessively high vitamin potency is contraindicated, however, for Lohr and Unger found that a concentration of vitamins much higher than that found in

TABLE 5
Commercial Cod Liver Oil Ointments.

Preparation	Vitamin Units Per Ounce	Per Cent U.S.P. Cod Liver Oil Content	Ointment Base	Approx. Cost per lb. (Retail).
Patch's Gadoment. The E. L. Patch Co. Boston, Mass.	59,550 A. 5,955 D.	245%	Wax, benzoin, zinc oxide	\$2.00
White's Vitamin A and D Ointment. White Laboratories, Inc. Newark, N. J.	54,148 A. 5,414 D.	225%	Petrolatum, etc.	\$2.67
Morruguent Ointment. The S. E. Massengill Co. Bristol, Tenn.-Va.	31,650 A. 3,165 D.	125%	Petrolatum, etc.	\$2.40
Adestrin Ointment. George A. Breon & Co. Kansas City, Mo.	22,000 A. 3,140 D.	90%	Oxycholes- terinated base	\$3.00
Nason's Vitaguent. Tailby-Nason Co. Boston, Mass.	15,876 A. 1,700 D.	65%	Zinc boro- salicylate, etc.	\$2.00
Unguentum Morru-Comp. Hart Drug Corp. Miami, Fla.	14,500 A. 1,450 D.	60%	Emulsion	\$2.00

the natural state of cod liver oil retards rather than accelerates wound healing. Certainly it is unwise to evaluate the therapeutic activity of cod liver oil ointments solely on their vitamin contents.

ILLUSTRATIVE CASE REPORTS

CASE 1.—A married woman of 22 was seen in consultation with Dr. Oren Moore to whom she had been referred nine months before because of severe chronic progressive undermining burrowing ulceration of the abdomen. This had followed a simple appendectomy performed elsewhere four months previously. Great improvement followed three weeks' hospital treatment under Dr. Moore's care. But after two months of home treatment with Dakin's solution under two special nurses she returned in worse condition. She then showed an ulcer larger than a square foot in area involving the ventral wall of most of the lower abdomen with deeply undermined suppurating edges and sinuses extending far to the right flank and under the pubic bone. All tissues including fascia had been destroyed down to the muscle exposing most of the iliac crest, and the ulcer was bathed in pus. Suffering agony, again a morphine addict, and toxic from high fever, the patient's condition was desperate.

Repeated blood cultures were negative. Wound cultures always showed *Staphylococcus aureus*. It is unfortunate that anaerobic cultures were not made. Undoubtedly they would have demonstrated the micro-aerophilic hemolytic streptococcus reported by Meleney^{72, 73} in 1935 to be the causative agent

in chronic undermining burrowing ulcer of which this was clinically a typical example. The finding of this organism might have prompted the use of zinc peroxide which Meleney has proven such an effective cure in these cases.

Systemic disease was ruled out. For two weeks the wound was dressed with bismuth violet, but the ulceration progressed until Dr. Moore performed wide cautery excision of the entire diseased tissue. This temporarily stopped the ulcer's progress. But bismuth violet, Dakin's solution, saline and peroxide irrigations, staphylococcus vaccine, Thiersch grafting, and other treatments suggested by many consultants accomplished practically no healing during the next five and one-half months, and the wound edges again became deeply undermined. Anorexia resulted and severe anemia developed despite repeated blood transfusions; wound dressings caused frightful pain; and her condition steadily deteriorated. Figure 1 shows the ulceration soon after cautery excision by Dr. Moore and before emaciation became marked.

When first seen with Dr. Moore at the Presbyterian Hospital on Feb. 25, 1938, thirteen months after the ulceration began, the patient's weight had fallen from 135 to approximately 70 pounds, severe flexion contractures of knees and thighs were present, and her morale was utterly shattered. The ulcer appeared only a little smaller than in fig. 1, but was more deeply undermined. Although the outlook appeared hopeless, cod liver oil therapy was advised. Fifty per cent cod liver oil-vaseline ointment on gauze was applied locally. Every twelve hours cod liver oil was poured on, and dressings were changed every two days. The result was miraculous. Within thirty-six hours she became comfortable and slept without pain for the first time in months. On the eleventh day she was up in a chair after three months in bed. Almost overnight the wound took on new activity and soon was covered with fresh, clean, healthy, red granulations. Large areas filled in. Within a month the size of the ulcer was reduced more than 40 per cent, its area being now about 70 square inches (fig. 2).

Five weeks after starting cod liver oil treatment the entire area was grafted under cyclopropane with thick split skin grafts after excising the granulations and cutting away overhanging edges above the pubis. The graft covered about 72 square inches. The wound had been further prepared by continuous sterile saline compresses for 48 hours previously, and appeared clean. But probably because of infection persisting under the pubis or because of movement of the abdomen the grafts became infected, and only a 15 per cent "take" resulted. However, from scattered areas of viable graft epithelization proceeded under cod liver oil therapy so that soon a third of the wound was healed. Subsequent grafting by Drs. Moore and J. Stuart Gaul and the constant use of cod liver oil completed the epithelization; and seven and one-half months after cod liver oil therapy was instituted the twenty-months-old ulcer was completely healed. No photographs were obtained.

Unfortunately, some of the donor sites on the thighs were cut too deeply at the skin-grafting operation, and subsequently became infected with the original ulcerative organism. In spite of all treatment these progressively ulcerated until one thigh was honeycombed with deep necrosing ulcers which in places burrowed to the femur. Because of flexion contractures they could not be kept free of discharge, and continued to burrow hopelessly. In these pus-filled sinuses cod liver oil was without effect.

While the abdominal ulcer was healing under cod liver oil the patient showed general progressive improvement. But six weeks after the abdomen had healed she developed lobar pneumonia and died.

This is a typical case of chronic undermining burrowing ulcer caused by a microaerophilic hemolytic streptococcus demonstrable only on anaerobic culture as described by Meleney^{72, 73}. Heretofore



Fig. 1. Appearance of abdomen 10 months after ulceration began and 1 month after wide cautery excision of necrotic suppurating undermining wound edges (case 1).

Fig. 2. Result of 1 month's treatment with cod liver oil ointment. Compare with fig. 1 (case 1).

the only effective treatment reported has been the use of zinc peroxide. This is the first reported cure of this rare type of ulceration by means of cod liver oil therapy. Complete healing occurred in seven and one-half months after treatment with a variety of antiseptic agents had previously proved ineffective for thirteen months.

CASE 2.—P. A., a 34-year-old laborer, underwent appendectomy Feb. 16, 1938, through a McBurney incision which required upward enlargement for removal of an immovable deeply placed retrocecal subacute appendix reaching

to the liver. Operation was difficult and heavy traction necessary. Postoperative ileus with serious vomiting almost proved fatal and, together with severe distention, caused wound disruption. By the twelfth day grave infection had completely ruptured the wound and destroyed the entire belly wall over an area measuring $4\frac{1}{2}$ by $2\frac{1}{2}$ inches within which the intestines, covered with exudate, lay free. Simultaneously, a larger necrosing area of cellulitis developed posterolaterally in the right flank. With alarming rapidity all soft tissues between the two wounds were destroyed down to the fascia by a progressive undermining ulceration which spread 4 inches under the skin deep into

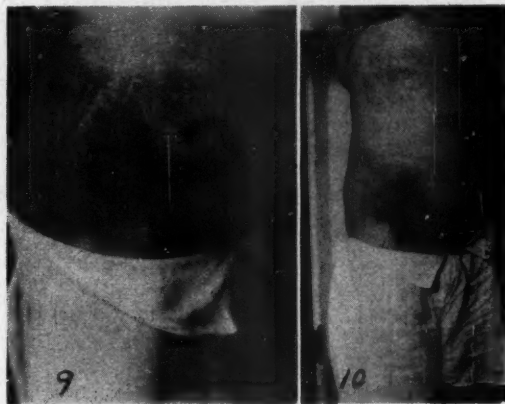


Fig. 3. Showing excellent healing $6\frac{1}{2}$ weeks after beginning treatment with cod liver oil ointment. Note large ventral herniation and healed ulceration of flank. See also counter incision deep in right flank indicating extent of undermining ulceration (case 2).

Fig. 4. Final appearance 20 days after successful repair of large ventral hernia (case 2).

the right flank. Here a counter incision was made for drainage, and on the sixteenth day all wounds, including the naked intestines, were dressed with 50 per cent cod liver oil ointment on gauze.

Progressive ulceration stopped immediately, infection rapidly subsided, and excellent healing began. The patient was discharged on the fortieth day, and healing was completed under cod liver oil therapy at home within three weeks (fig. 3). Some months later the extensive ventral hernia was successfully repaired, using Babcock's ruthless steel wire throughout. The skin scar was found widely adherent to the underlying intestines. Figure 4 illustrates the final appearance of the wound twenty days after herniorrhaphy. The patient remains in good health doing hard manual labor.

This is the first reported case describing the successful application of cod liver oil to the naked intestines. It demonstrates the effectiveness of the oil in stopping a serious rapidly progressive burrowing ulceration following grave infection and rupture of an abdominal wound. Cod liver oil prevented the development in this case of an

uncontrollable ulceration similar to that which occurred in Case 1, and proved life-saving.

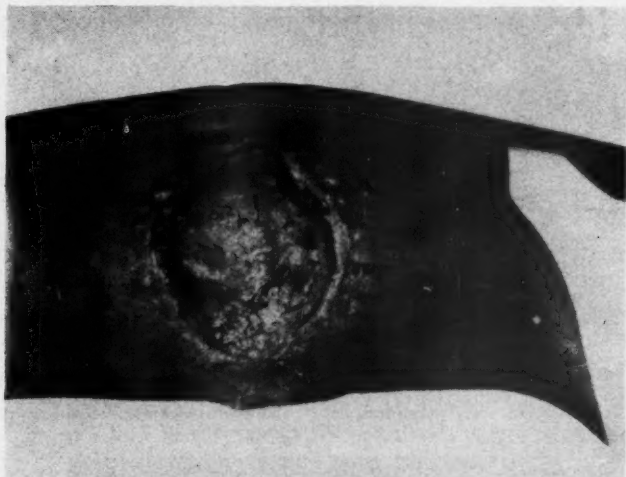


Fig. 5. Showing intestines covered with granulations 10 days after starting cod liver oil therapy in complete abdominal wound rupture (case 3).

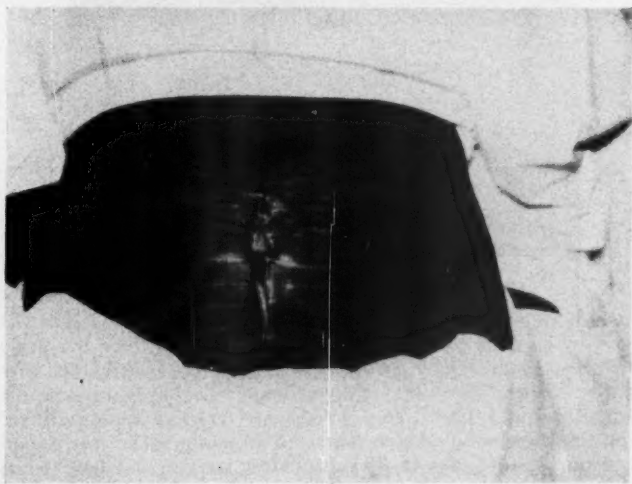


Fig. 6. Final appearance 4 months after wound rupture and 3 months after secondary closure with rustless steel wire. No hernia (case 3)

CASE 3.—L. H., a 25-year-old negro woman, developed a fulminating wound infection following a difficult prolonged hysterosalpingectomy without drainage for severe chronic pelvic inflammatory disease. Complete dehiscence

occurred on Sept. 7, 1940, the ninth postoperative day, with wide separation of the undermined wound edges, extensive rupture of the peritoneum, and considerable eventration of the intestines which bulged into the necrotic depths of



Fig. 7. Extensive soft tissue destruction and multiple comminuted compound fractures with practically complete disintegration of hand (case 4).



Fig. 8. Roentgenogram of hand (case 4).

the wound covered with pus. The wound was immediately packed with adestrin cod liver oil ointment on gauze applied directly to the eviscerating intestines followed by dry gauze and adhesive strapping. There was no further evisceration. General peritonitis did not occur. Cod liver oil dressings were replaced every 3 or 4 days. The wound soon cleaned up nicely with reduction of the profuse purulent discharge and rapid formation of healthy granulations. Figure 5 taken September 17, ten days after starting cod liver oil therapy, shows intestines covered with granulation tissue. On October 10, after a month of adestrin ointment treatment, the widely gaping edges of the wound were easily approximated with multiple interrupted rustless steel wire sutures placed down to the healthy granulations, with a central drain. Healing was complete by December 1, twelve weeks after dehiscence. Figure 6 taken Jan. 9, 1941, four months after wound rupture, shows final strong healing. There is no hernia; the patient remains well.

This is the second reported case of the successful direct application of cod liver oil ointment to the intestines in complete rupture of an abdominal wound with serious infection. It illustrates the satisfactory cleaning up of a grave infection by cod liver oil therapy.

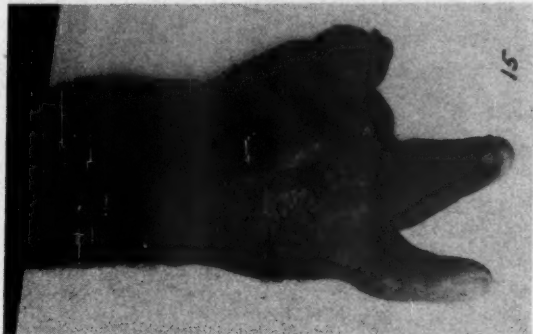


Fig. 9. Final result 6 months after repair and treatment with cod liver oil ointment. Note minimal scarring and excellent covering of dorsum of hand and of metacarpal ends. Compare with figs. 7 and 8 (case 4).



Fig. 10. Final appearance of palmar surface of hand (case 4).

CASE 4.—J. S., a farmer, aged 62, was rushed to the hospital June 8, 1938, immediately after his gloved right hand had been mangled in a threshing machine. There were multiple compound comminuted fractures of thumb, all fingers, and three metacarpals. The thumb was nearly severed by multiple lacerations. There was complete avulsion of the index and middle fingers, which hung only by shreds and were not viable. The fourth and fifth fingers were very gravely lacerated, while all soft tissues of the dorsum had been torn from the hand with extensive tissue loss, division of all extensor tendons, and practically complete disintegration of the entire hand (figs. 7 and 8).

At operation, under ether, the extremity was thoroughly washed with soap and sterile water, and extensive plastic repair accomplished, especial attention

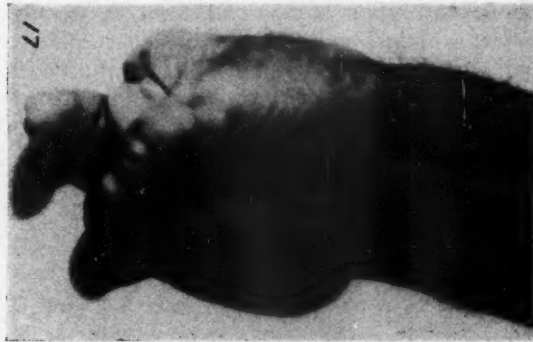


Fig. 11. Showing good functional result with satisfactory motion of thumb and fifth finger. Note ankylosis of fourth finger. Compare with figs. 7 and 8 (case 4).

being devoted to minimal debridement and careful preservation of all viable tissue. After completing the amputation of the index and middle fingers, all comminuted compound fractures of thumb and fingers were reduced, surviving tendons sutured with silk, dorsal soft tissues re-established, index and middle metacarpal exposed ends covered with tissue, and appropriate drainage placed under the dorsal flap. No skin sutures were used. The injury was dressed with continuous warm saline gauze compresses, with digits splinted in semi-flexion. Fever of 102 degrees on the second day fell to normal on the fifth day; no infection occurred.

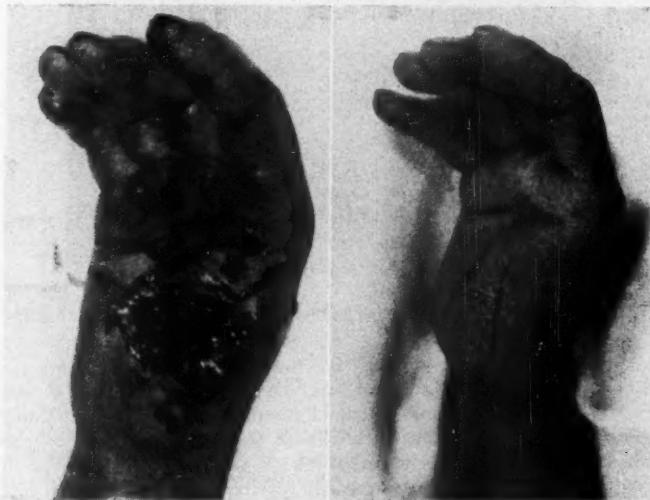


Fig. 12. Traumatic amputation of thumb with wide soft tissue loss. Primary closure of proximal half of wound. Distal wound left open and treated with cod liver oil ointment (case 5).

Fig. 13. Complete healing on 24th day. Photograph showing final result on 27th day (case 5).

On the fifth day the wound was liberally dressed with 50 per cent cod liver oil-vaseline ointment saturated gauze, and the patient discharged. The hand was dressed in the dispensary for ten weeks, and healing was complete after several months (figs. 9, 10 and 11). There is surprisingly little scarring. The thumb has good motion and can be approximated to the normal fifth finger and the ankylosed fourth finger, giving a very useful hand. This excellent result must be attributed largely to cod liver oil.

CASE 5.—N. R., aged 37, had his right thumb amputated by a buzz-saw on Sept. 6, 1940, dividing the metacarpal at its distal two-thirds and leaving a wide open wound extending to the base of the thenar eminence with com-

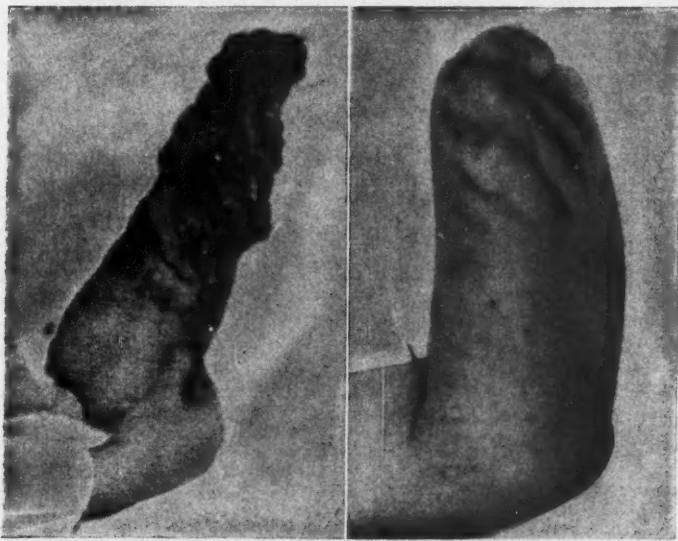


Fig. 14. Traumatic amputation of right arm by machinery with shredding and severe soft tissue damage and loss (case 6).

Fig. 15. Final result showing complete healing under cod liver oil ointment 11 weeks after injury. Photograph taken at 12 weeks. Note maximum preservation of all tissues, and bone ends well covered with soft tissue. Scarring is minimal (case 6).

minution of the bone and considerable muscle destruction. Figure 12 shows the wound when first seen two and one-half hours after the accident. The surrounding skin and wound were thoroughly scrubbed with sterile soap and water under local procaine anesthesia. Minimal removal of comminuted bone fragments was done, leaving as much metacarpal as possible. Deep tissues were partially sutured without tension with plain 1 catgut; and the skin over the base of the thenar eminence was closed with interrupted silk over the proximal half of the wound. The remainder of the wound for about 4 cm. gaped open 2 or 3 cm., and was dressed with Nason's vitaguent cod liver oil ointment. The hand was immobilized, and dressings changed every three days. No infection occurred and the sutured wound healed per primam. The remaining

open wound granulated in very rapidly, and was completely healed 24 days after the amputation. Figure 13 taken the twenty-seventh day shows perfect healing, good motion, and excellent function.

CASE 6.—Y. R., a white ginner, aged 28, had his right arm literally torn to shreds when caught in the gin machinery on Oct. 31, 1940. Examination soon after the accident showed traumatic amputation of the hand with disintegration of carpal bones, compound fracture of lower radius, and an indescribable injury involving all soft tissues of the forearm proximally to within 6 cm. of the antecubital space. Six deep oblique lacerations across the dorsal forearm merged distally into multiple linear lacerations. All soft tissues including skin, fascia, muscles, and interosseous membrane were torn into shreds. Many long flaps of skin and fascia, and all muscles of the lower forearm torn loose from the bones were hanging free (fig. 14). Under ether anesthesia, surrounding areas and all parts of the injury were thoroughly scrubbed for ten minutes with sterile soap and water. Uninjured skin was swabbed with tincture of merthiolate, but no antiseptic was used in the wound. Conservative amputation was performed $3\frac{1}{2}$ inches above the wrist at the lowest possible point where tissues appeared viable. Debridement was very carefully performed, removing only a few shreds of hopelessly injured muscles, fascia, subcutaneous tissue and skin tags, and leaving all potentially viable tissues including many long narrow skin flaps. The entire mass of shredded, loosely attached soft tissues was pulled distally and molded around the bones forming a generous covering of the bone ends. Half a dozen zero chromic stitches loosely closed the deep muscles. No other sutures were used. All portions and recesses of the wound were thickly covered with morruguent ointment, a snug dry gauze dressing was applied, and the arm elevated. Combined gas and tetanus anti-toxin was given, and large doses of sulfanilamide administered orally for four days. The highest temperature was 100.8 degrees on the second day, falling to 99.6 on the fourth day, and soon reaching normal. Because the patient was to be transferred to a hospital in another city, the wound was dressed on the fourth day. There was no infection, very little sloughing, and the tissues appeared healthy. Morruguent ointment was again used locally and dry gauze applied. After transfer, the temperature remained normal, but the attending physician preferred to use a daily saline dressing, though no infection developed. After three weeks the patient was returned home where 50 per cent cod liver oil ointment dressings were applied every 4 or 5 days. He returned to work five weeks after the injury and was completely healed eleven weeks after the accident. Figure 15 shows the excellent final result at twelve weeks.

This patient presented a compound injury to the arm of maximum severity. By the use of the cod liver oil method infection, gas gangrene, and osteomyelitis were avoided; maximum bone and soft tissue were preserved; and rapid healing produced a long useful forearm stump with the bone ends well covered with thick, freely movable soft tissue. The final result is superior to all expectations.

CASE 7.—N. L., aged 57, entered the hospital March 25, 1940, with multiple fractures of the right leg and an intertrochanteric fracture of the left hip. The fractured leg was reduced and a cast applied. A marked congenital kyphos producing a right angle deformity of the thoracic spine prevented application of a spica and necessitated treatment of the fractured hip in extension. With the



Fig. 16. Large decubitus ulcer over prominence of congenital kyphos. Note sloughing fascia (case 7).

Fig. 17. Same ulcer with hemostats demonstrating deeply undermined edges (case 7).

Fig. 18. Appearance of ulcer after 10 weeks of cod liver oil ointment therapy following wide excision of undermined edges. Size of ulcer now measures only 40 per cent of that illustrated in figs. 16 and 17 (case 7).

Fig. 19. Final result. Completely healed after 6½ months of cod liver oil therapy. Scar is small, soft, non-adherent except in center, and has no tendency to break down (case 7).

Fig. 20. Final result. Patient well. Note marked right angled congenital kyphos deformity and position of healed decubitus ulceration (case 7).

patient necessarily immobilized on his back a serious decubitus ulcer inevitably developed over the kyphos. Five weeks after admission, when the patient could be turned on his sides for the first time, the ulcer measured 10 by 13 cm. with a depth of 1.2 cm. Infection was present with much sloughing of fascia. Figures 16 and 17 show the ulcer on May 1, the hemostats indicating the edges undermined for 2 or 3 cm. Six weeks after admission, on May 4, wide excision of the undermined ulcer edges was performed with removal of sloughing fascia and infected granulations. Now measuring 13 by 15 cm. and 1.5 cm. deep, the ulcer was dressed every few days with 50 per cent cod liver oil petrolatum ointment on gauze. With the patient kept off his back, granulations quickly filled in, and by August 10, ten weeks after the operation, rapid healing had reduced the ulcerated area to 7.5 by 10 cm. (fig. 18). On that date a thick split skin graft was carefully sutured to cover the entire ulcer from which the granulations had been excised, but failed completely to "take" because it slipped from the kyphos. This delayed healing. Thereafter, the ulcer was dressed every few days with unguentum morru-comp on gauze, and it continued to heal satisfactorily. Thirteen weeks after operation, on August 5, the ulcer measured only about 4 by 5 cm., and the patient was discharged to the County Home where attendants dressed it with unguentum morru-comp every few days. Healing was complete by November 15, approximately six and a half months after operation, the patient making an excellent recovery from his fractures. Figures 19 and 20 taken Jan. 3, 1941 (eight months after operation) show only a small soft scar which is freely movable except at its center where it is deeply attached.

Cod liver oil treatment of this terrible ulcer was very effective, painless healing resulting with minimal scarring. The healing time might have been considerably shortened had the patient remained under direct surgical supervision instead of being transferred from the hospital to the County Home.

CASE 8.—W. L., a 20-year-old negro, was shot in the left side June 15, 1939. From a distance of 10 feet the entire shotgun load penetrated the ala of the ilium and passed to the midline of the pelvis. Figure 21, the admission roentgenogram, shows the compound comminuted fracture of the ilium with multiple shot and bone fragments carried to the midline of the pelvis. Laparotomy revealed that the entire charge had passed retroperitoneally causing an extensive hemorrhage which stripped up the posterior peritoneum and bulged into the lower abdomen and pelvis. Miraculously, there was no intra-abdominal or pelvic perforation and no aortic or bladder injury. The abdomen was closed without opening into the retroperitoneal space. After thorough soap and water scrubbing the gun shot wound through the shattered ilium was explored. Multiple shot and bone fragments were removed. The external wound was thoroughly debrided. The deep retroperitoneal wound was then packed with a dry gauze uterine pack to control bleeding, and a pressure dressing applied. The patient reacted well after a transfusion.

Postoperative Course: Sulfanilamide and tetanus antitoxin were administered. On the fifth day the packing was removed under gas. The wound was foul with pus; and much debris, many shot, and some additional bone fragments were removed from the depths. Bleeding having ceased, the entire wound which was over 7 inches deep was packed with 50 per cent cod liver oil-vaseline ointment on gauze. The patient did well. Six days after first



Fig. 21. Admission roentgenogram of compound shot gun wound through left ilium. Note hole through ilium and multiple shot carried retroperitoneally to midline of pelvis (case 8).

Fig. 22. Roentgenogram 4½ months after injury. Only a few shot remain inside compound fracture wound of ilium. No osteomyelitis (case 8).

dressing, the packing was again changed under gas. The wound was found cleaning up nicely under cod liver oil ointment. Drainage was moderate, more shot and debris were removed, and cod liver oil ointment gauze packing replaced. Abdominal wound healed per primam. On the thirteenth day the patient was up in a chair, and soon walked. Three and one-half weeks after the injury he was discharged still running one-half degree of fever. The wound

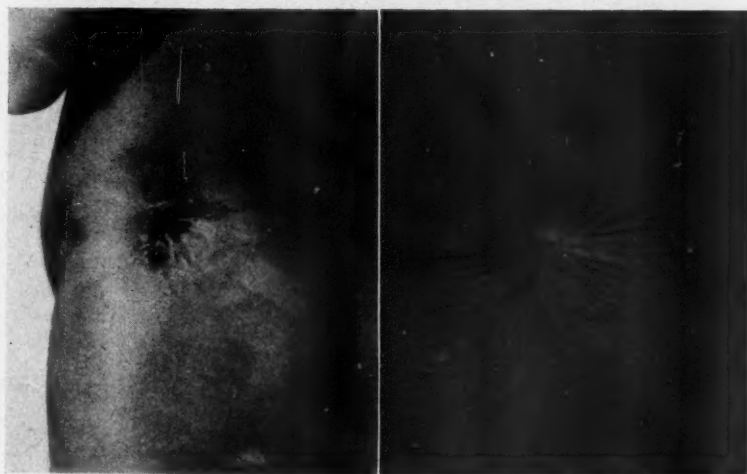


Fig. 23. Appearance of wound at 4½ months. A small sinus still leads to the hole in the ilium (case 8).

Fig. 24. Showing final result of compound shot gun wound through left ilium treated with cod liver oil ointment. Complete healing 7½ months after injury. Close up photograph at 21 months (case 8).

still discharged considerable pus, shot, and an occasional bone fragment. Originally 7 inches deep, the wound was now only 3½ inches deep, showed good granulations, and was healing rapidly under cod liver oil dressings changed every 3 or 4 days, and continued in the dispensary. Figure 22 shows the roent-

genogram taken Nov. 2, 1939, four and a half months after the injury. Only a few shot remained inside the ilium with no evidence of osteomyelitis in the fractured bone. Figure 23 shows the appearance of the wound on the same date. Only a small sinus remained down to the perforated ilium. The patient felt fine at this time and was working. Under ether the entire scar tissue about the sinus tract was widely excised, leaving a cone-shaped opening down to the fracture in the ilium. The wound was found clean, without osteomyelitis. One old bone fragment and additional shot were removed. There was excellent healing by clean granulations from just inside the compound fracture hole in



Fig. 25. Extensive deep third degree burn of right lower extremity photographed on 21st day, 24 hours after surgical excision of adherent tannic acid crust (case 9)



Fig. 26. Another view showing depth and extent of third degree burn. Note exposed tendon of biceps femoris (case 9).

the ilium. The wound was packed with 50 per cent cod liver oil ointment, and the patient discharged after a week. Dressings were changed infrequently in the dispensary. Healing was rapid and, by Feb. 1, 1940, seven and a half months after the injury, complete healing had occurred. Figure 24 is a close-up view of the healed gun shot wound taken 21 months after the boy was shot.

This case illustrates the effect of cod liver oil in cleaning up a serious deep gun shot compound fracture wound which formerly would have been treated by Dakin's irrigations, etc. Excellent rapid healing occurred seven and a half months after the injury without the development of osteomyelitis. The final result was perfect.

CASE 9.—L. O. K., aged 49, critically burned over 41 per cent of the body when a blow torch ignited his clothing Sept. 30, 1935, was seen immediately



Fig. 27. Final result at 9 months after treatment with cod liver oil ointment and two skin grafting operations (case 9).

Fig. 28. Final result at 9 months. Note smooth healing of grafted thigh and upper leg contrasted with increased scarring of ungrafted portion of lower leg. Compare with fig. 25 (case 9).



Fig. 29. Showing excellent functional result. Note absence of contractures or deformity about knee joint (case 9).

Fig. 30. Final result, at 9 months. Note smooth healing of thick split skin grafts and satisfactory cosmetic appearance (case 9).

and did well under tannic acid treatment. In less than three weeks the coagulum separated from the second and third degree burns of the entire face and neck, both arms and hands, medial left buttock, thigh and leg, and entire perineum. These eventually healed with considerable scarring. Because the coagulum remained densely adherent, it was excised surgically from the entire right lower extremity on the twentieth day. Figures 25 and 26 taken the next day show the entire limb except the upper anterior thigh, ankle and foot involved in a destructive third degree burn so deep that the tendon of the biceps femoris is clearly exposed.

Treatment of this extensive deep ulceration measuring approximately $3\frac{3}{4}$ square feet in area presented a most serious problem. Lack of facilities precluded the use of a saline bath. Open air treatment under a lighted burn tent caused unbearable pain, and the agony accompanying boric ointment dressings for two days indicated that some other therapy was imperative. I then tried cod liver oil for the first time in my experience. Fifty per cent cod liver oil-vaseline ointment was applied to the limb on gauze, and the entire limb wrapped in sterile towels. Every eight hours cod liver oil was poured on the gauze and the dressings were changed every two days.

Immediate striking relief from pain resulted. The oil saturated dressings never adhered to the wound and were changed without pain; the patient was comfortable and contented. In a remarkably short time all sloughs separated; the wound was converted into a clean ruddy surface covered with healthy granulations, and was deemed ready for skin grafting nine days after cod liver oil therapy was started. The family delayed grafting for five weeks; but on the sixty-sixth day, 90 square inches of thick split skin grafts taken from the patient's left thigh were applied to the medial and lower anterior right thigh, entire knee and popliteal space, and part of the medial and anterior leg by Blair's⁷⁶ technic. A 100 per cent successful "take" resulted. Cod liver oil ointment therapy was continued meantime, and two and one-half months later at a second operation 87 square inches of thick split skin grafts were transferred to the unhealed right buttock, posterior thigh, and parts of the leg with a 95 per cent successful "take". Further surgery being refused, cod liver oil treatment was continued at home.

The patient walked at the end of eight months. Figures 27, 28, 29 and 30 show him completely healed with excellent function at nine months. He returned to his former occupation ten months after the accident with a 5 per cent disability rating for slight heel cord shortening. This soon disappeared under treatment. The patient remains in perfect health, and working.

Following adequate tannic acid treatment this man presented an unhealed third degree ulceration involving practically an entire lower extremity measuring approximately 530 square inches in area. Tissue destruction was so deep that epithelization could progress only from the periphery, all epithelial elements throughout having been destroyed by the burn and by the excision of the adherent coagulum. One-third of this area, equaling 177 square inches, was successfully restored by skin grafting. The remaining two-thirds measuring $2\frac{1}{4}$ square feet was healed in nine months by cod liver oil therapy, with a perfect final result. Had cod liver oil instead of tannic acid been employed in the beginning, it appears probable

that any epithelial elements still surviving within the burned area might have been saved. This would have allowed epithelization from scattered islands throughout the ulceration with consequent

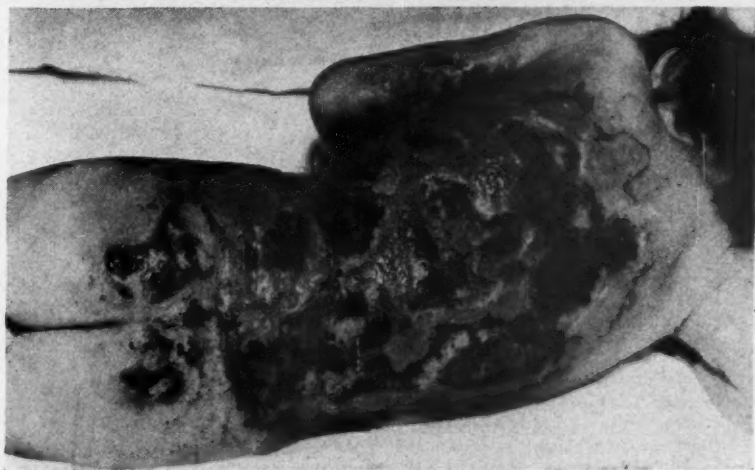


Fig. 31. Severe third degree burn of entire back, left side, and part of left arm treated with cod liver oil ointment. Photographed on 8th day (case 10).

Fig. 32. Satisfactory "take" of multiple thick split skin grafts 3 weeks after operation. Note healthy appearance of granulations between grafts under cod liver oil therapy (case 10).

shortened healing. As it was, the case demonstrates well the failure of tannic acid to deal with the deeper types of burns, and fully illustrates the advantages of cod liver oil therapy.

CASE 10.—M. G., a child of 4, sustained severe third degree flame burns of the entire back, left side, and part of left arm on Nov. 25, 1939, equalling 21 per cent of the body surface. At home her doctor merely anointed the burns with some sort of ointment, but after 36 hours she was hospitalized. On ad-



Fig. 33. Final result photographed at 11 months. Complete healing at 3 months. Note excellent cosmetic result with minimal scarring. Impossible to differentiate between grafted areas and ungrafted areas which healed under cod liver oil (case 10).

mission her temperature was 103 degrees, pulse rate 136 per minute, hemoglobin 104 per cent, leukocytes 16,000, polymorphonuclears 78 per cent, and urine negative. With no particular debridement, her physician dressed the burns with Patch's gadoment cod liver oil ointment applied on gauze every few days. The patient required no parenteral fluids and was not transfused until after the extensive skin grafting operation performed later by me. Figure 31 shows the appearance of the burn eight days after admission. In spite of an irregular fever of 101-104 for several weeks, she showed no gross infection; and general condition was reasonably good. Eighteen days after admission she showed a third degree ulceration of the back, side, and arm

measuring about 120 square inches and requiring skin grafting. Under gadoment ointment the granulations were clean and ready for grafting. Following continuous sterile saline compresses to the granulations for 48 hours, operation was performed on the twenty-third day after the burn. A number of thick split skin grafts with total area of about 50 square inches were removed from the thighs and grafted directly to the patient's back, side, and arm without excising the granulations. Since it was impossible to cover the entire denuded surface at one operation, the grafts were arranged with areas of granulation



Fig. 34. Thirteen year old colored girl with 2nd and 3rd degree burns of 62 per cent of the body treated with cod liver oil ointment. Photograph taken on 31st day (case 11).



Fig. 35. Showing burns of entire back and left side of body photographed on 31st day. Note deep decubitus ulcer (case 11).

remaining between them. A 90 per cent successful "take" resulted. Figure 32 shows the grafted area three weeks after operation. On Feb. 7, 1940, seven weeks after operation, she was discharged with the ungrafted areas healing rapidly under gadoment ointment, and healing was complete three weeks later, approximately three months after being burned.

Figure 33 shows the patient eleven months after recovery. There is minimal scarring with no fixation, and it is impossible to tell which

parts were grafted and which healed under cod liver oil. Final result is excellent. Note good cosmetic result with practically invisible donor scars on thighs. Practically all of this severe 21 per cent burn was third degree, yet healing was excellent under cod liver oil therapy.

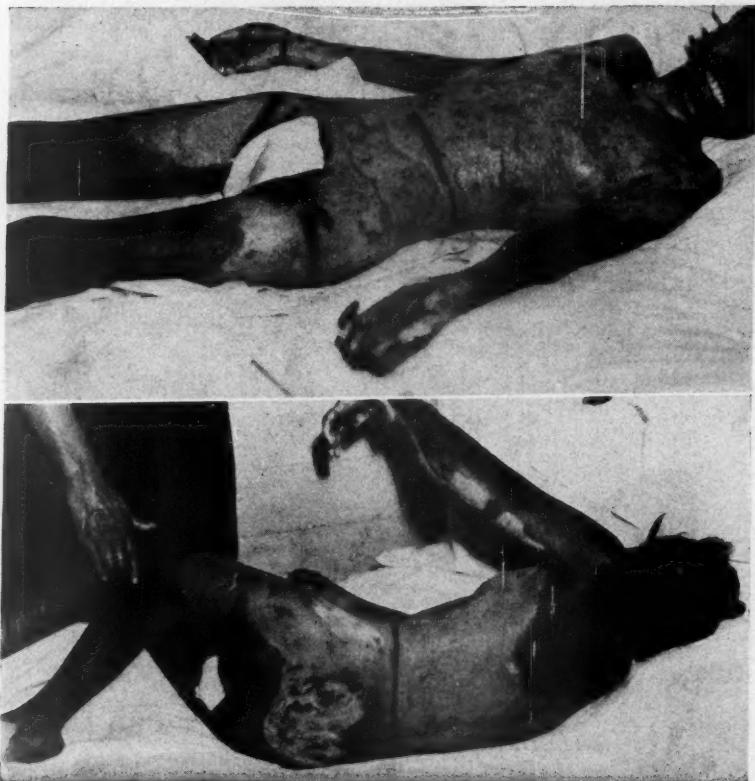


Fig. 36. Appearance of burns 10½ weeks after the accident showing satisfactory healing of 80 per cent of burns under cod liver oil ointment. Abdomen almost completely healed. Note good general condition of patient (case 11).

Fig. 37. Another view showing complete healing of back, left side, arm, and thigh after 10½ weeks of cod liver oil treatment. Note increased size and severity of sacral decubitus ulcer (case 11).

CASE 11.—W. M., a colored girl of 13, sustained second and third degree kerosene burns of half the face and neck, three-fourths of the upper extremities, the entire chest, abdomen, back, both sides of the trunk, and half the buttocks and thighs totalling 62 per cent of the body surface, Dec. 15, 1940. A Negro physician saw her two hours after the accident, and treated her unassisted at home. He washed the burns with soda bicarbonate solution, opened blisters, did not excise burned skin, dressed the burns daily with a mixture of 80 per cent cod liver oil and 20 per cent butesin picrate, applied gauze, and

used a burn tent. Fluids were forced orally, but neither parenteral fluid nor transfusion was given. Opiates were never required. No laboratory work was done. The patient was delirious on the fifth day, but thereafter improved progressively.

When first seen in consultation on the twenty-ninth day, the child was bright, cheerful, and comfortable. In spite of temperature of 102.8 and pulse rate of 160 per minute, she did not appear toxic. Much healing had occurred; there was considerable scaling and crusting; but the abdomen and chest showed good clean granulations. There was a deep lumbar bed sore. On the thirty-first day figures 34 and 35 were taken; and she was started on dressings of 80 per cent cod liver oil-petrolatum ointment on gauze changed every few days. Five days later she showed hemoglobin 48 per cent, the red count 2,510,000, white count 14,200 with 78 per cent polymorphonuclears; the urine had a specific gravity of 1.026, but was negative for albumin, blood cells, or casts. Temperature was down to 101, and pulse rate 144 per minute. Adequate diet and hematonic medication were instituted.

By the forty-fifth day considerable edema of face, left arm and feet developed. This cleared up, and the urine remained negative. Eight weeks after being burned the back showed almost complete healing while under cod liver oil dressings epithelium covered more than half of the abdomen. Figures 36 and 37, taken Feb. 27, 1941, show excellent healing of over 80 per cent of the burns ten and one-half weeks after the accident. Remaining granulations are clean, and rapid healing continues. Skin grafting will not be required. Temperature is 100 degrees, and pulse 120-130 per minute. No transfusion has been given, but under proper diet, adequate medication, and oral vitamin B and C administration the severe anemia is improving.

In spite of home treatment under conditions far from ideal, this patient burned over 62 percent of the body, has escaped infection and continues to show remarkably rapid healing under cod liver oil therapy. She is not toxic and is daily growing stronger. Except for the increasing severity of the lumbar decubitus ulcer, her chances for ultimate recovery appear excellent. The circumstances surrounding this unusual case are dramatic proof of the effectiveness of the cod liver oil therapy of burns.

CASE 12.—H. Y., an electric linesman, aged 28, was rendered unconscious by an 11,000 volt shock Dec. 16, 1940. When first seen four days after the accident the right palm showed four deep electric burn blisters, and the left forefinger showed necrotic blisters on the dorsum of the two distal phalanges, and between two fingers. All blisters were excised and the burns dressed with White's vitamin A and D ointment every 4 or 5 days. The other burns healed rapidly, but three weeks after the accident the left forefinger showed the deep destructive sloughing typical of severe electrical burns illustrated by figs. 38 and 39 taken Jan. 7, 1941. The extensor tendon had sloughed out, and the distal interphalangeal joint was fully exposed. Amputation appeared possibly necessary. However, under White's vitamin A and D ointment, with infrequent dressings and a finger splint, sloughing rapidly cleaned up, and granulations filled in the extensive defect with unusual celerity. Seven and one-half weeks after the injury healing was complete, as shown by figs. 40 and 41 taken on February 15, five weeks after figs. 38 and 39, and two months after the accident.

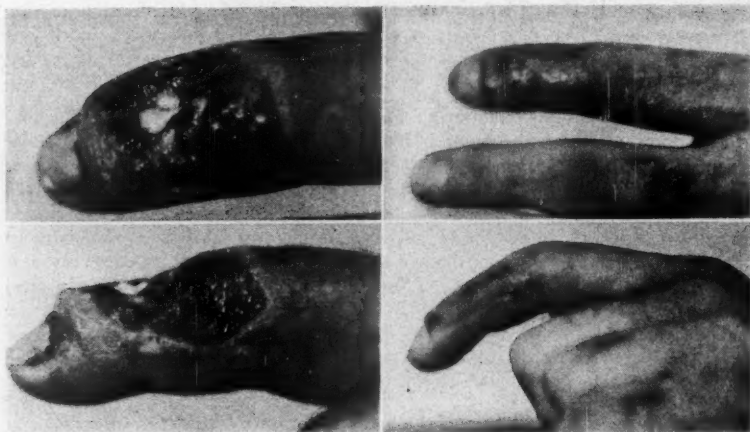


Fig. 38. Deep burn of forefinger caused by 11,000 volt shock with sloughing of extensor tendon and exposure of interphalangeal joint. Appearance at 3 weeks (case 12).

Fig. 39. Lateral view showing depth of sloughing and exposed bones (case 12).

Fig. 40. Final result showing complete healing with no infection as result of cod liver oil ointment treatment in 7½ weeks. This photograph taken at 4½ weeks after fig. 38 (case 12).

Fig. 41. Final result. Lateral view taken 4½ weeks after Fig. 39 (case 12).

This case demonstrates the remarkable healing effect of cod liver oil ointment, with granulations filling in rapidly over exposed bones without infection in the presence of a serious destructive deep electrical burn.

COMMENT

It is hoped that these few cases have demonstrated some of the unique advantages of the cod liver oil method.

Cod liver oil is not, however, a panacea for all the evils of wound healing. Exuberant granulations often require trimming and the application of silver nitrate. At times a change from the oil to the use of Bettman's⁷⁶ oxyquinoline scarlet R or bismuth violet ointment may be temporarily beneficial. Hot wet saline or boric compresses may be very useful. The patient should always have the benefit of early skin grafting when necessary.

Of course general disease must be recognized and adequately treated. Syphilis, diabetes, circulatory disease, erysipelas, cellulitis, lymphangitis, pyocyanus and gas infection require special treatment if cod liver oil therapy is to be effective. Hypoproteinemia must be prevented. The importance of proper diet can not be over-emphasized. Adequate cevitamic acid intake is essential for optimum

wound healing. Above all anemia must be corrected by medication and repeated transfusions of whole blood. Consideration must be given to all measures for improving the patient's general condition if best results are to be secured.

The only real disadvantage of cod liver oil therapy is the unpleasant fish oil odor more or less associated with the infrequently dressed wounds. This is reduced by the use of commercial ointments, and has not in my experience proved seriously disagreeable. No ill effects have been reported from hypervitaminosis. Irritation and maceration of the skin do not occur.

SUMMARY AND CONCLUSIONS

Cod liver oil is sterile and bactericidal. As a wound dressing it possesses a unique stimulating effect on granulation and epithelization. This results in rapid regeneration of tissue defects. The stimulating effect is probably chiefly due to its vitamin A and D content. The oil exerts also a beneficial generalized systemic effect, accelerates liquefaction of necrotic tissue, reduces the toxicity of pus, forms a protective non-irritating layer over the wound, requires infrequent dressings, is painless, and minimizes cicatrization.

Cod liver oil will not harm the most delicate tissues. It may be applied to the naked brain, the cornea, the exposed intestines, and all other tissues without irritation or fear of infection.

Cod liver oil therapy produces more rapid wound healing than other methods. It is so effective in cleaning up infected wounds and stimulating healing that it replaces Dakin's solution.

Cod liver oil offers an effective method of treatment applicable to the most severe major burns of all types, and superior in certain respects to other methods of local burn therapy, especially in third degree burns.

The first cure of chronic undermining burrowing ulcer with cod liver oil is reported as well as the first successful application of the oil to the naked intestines in two cases of complete rupture of an infected abdominal wound, with cure.

Various home-made and commercial cod liver oil ointments are discussed and compared. It is concluded that commercial ointments are superior to home-made preparations.

Cod liver oil ointment is recommended as a superlative method of local wound therapy applicable to both clean and infected wounds of all types and in the treatment of both new and old burns of major severity.

Note: Cases 1, 2, 4 and 9 are reproduced by courtesy of the North Carolina Medical Journal in which they were first reported.

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A CASE REPORT

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For quite some time I have been very much impressed with the persistency with which people who apparently are hopelessly ill cling to life. In spite of all types of diseases which ordinarily would be expected to terminate fatally they live on and develop new conditions equally as serious. The following case history is a demonstration of this:

Mr. W. W. E., a single white man, aged 58 years, was referred to me on Dec. 19, 1932, with a urinary retention. He had had a previous attack which had been relieved spontaneously on the way to the doctor's office. The attack from which he was suffering when he consulted me had lasted 24 hours. I passed a Laforce sound followed by a No. 15 American sound. There was some obstruction in the urethra which might have been a stone since there was a free hemorrhage of bright red blood. An x-ray taken at St. Vincent's, at that time, was negative except for a shadow in the neighborhood of the lower end of the left ureter and several calcareous deposits in the right kidney.

He had sounds passed at irregular intervals until May 29, 1933. At that time he came to the office complaining of pains in the abdomen and tenderness in the lower, right quadrant. Nausea and vomiting had begun 48 hours previously. There was marked rigidity all over his abdomen. He was sent into the hospital with a diagnosis of acute appendicitis. A gangrenous appendix was removed.

On Oct. 2, 1933, he came in complaining of a gastric disturbance of ten days' duration which he thought was due to an indiscretion in diet. He was given milk of magnesia without any relief of his symptoms and on October 16 an x-ray of his gastro-intestinal tract was reported as showing evidence of a penetrating ulcer of the lesser curvature of the stomach in the middle third. Dr. L. F. Magruder, the roentgenologist, stated: "It is my opinion that malignant degeneration is taking place." On October 21 a partial gastrectomy with a Polya long loop type of resection was done. The pathologist reported gastric carcinoma.

On Feb. 24, 1934, he developed a detachment of the right retina which was checked by Dr. Morgan, an eye, ear, nose and throat specialist. At that time his weight was 125½ pounds.

On March 29, he came in complaining of pain over his entire abdomen. His weight then was 120 pounds. He was rechecked on April 21, June 28 and August 11. Each time the notes were that his condition was satisfactory. His weight had dropped to 117½ pounds.

On Sept. 10, 1934, he came in complaining of two nodules in the skin, just below the costal margin, on the left side, with pain in the abdomen and along the descending colon. No masses could be felt. His weight was 118 lbs.

On September 22 his weight was 122 pounds and his condition had improved. On April 25, 1935, his weight was 127 pounds.

On Feb. 29, 1936, two precancerous lesions on the back of the left hand were destroyed with a radio knife. He was apparently free of abdominal

malignancy. On April 11 his hand had entirely healed and his weight was 127 pounds.

On Oct. 24, 1936, he came in complaining of pain in the right side which he thought was due to muscular effort associated with his work. An abdominal examination was entirely negative. His weight was 121½ pounds.

On Feb. 19, 1937, he was complaining of pains in his right leg. On July 17 there was some bone disturbance of the right femur which Dr. Vann, an orthopedist, thought was Paget's disease. He was x-rayed to determine the question of bone metastasis. The following is the x-ray report by Dr. C. W. Eley: "Bones of the right pelvis and right femur show changes characteristic of osteitis deformans, or Paget's disease. There is thickening of the cortex with arrangement of the trabeculae into strands or bundles running longitudinally and the femur shows enlargement and bowing. There is very suggestive evidence of pathological transverse fracture of the femur just a little below the trochanters with minimum deformity."

On Sept. 18, 1937, he was complaining of pains over his hypogastrium and had vomited once.

He was next seen on March 18, 1938, when he was sent into the Norfolk General Hospital following a spontaneous fracture of the right femur. It was a direct, transverse fracture of the upper third and since it was impossible to keep it in reduction two steel plates were put on by Dr. Vann. Incidentally they have never been removed and they have never given him any trouble.

On Aug. 25, 1938, he came to the office walking on crutches, but his general condition was satisfactory. His weight was 118 pounds.

On May 25, 1940, two lesions on his ear and one on the back of his left hand were destroyed with a radio knife.

On Jan. 27, 1941, he came in complaining of discomfort in his throat, hoarseness and some difficulty in swallowing. He was referred to Dr. Eley who reported that on barium study the esophagus and stomach were normal.

On February 10 he stated that he was no better and he was referred to Dr. Cooley for an investigation of his larynx. Dr. Cooley thought that there was a possibility of carcinoma of the vocal cord and he was to be sent into St. Vincent's for biopsy. He failed to go and we next saw him in July, 1942. At that time a biopsy of the vocal cord showed squamous cell carcinoma. There was a lapse of seventeen months between the time that a clinical diagnosis of carcinoma was made and the time it was proved by biopsy. He was referred to Dr. Eley for deep x-ray therapy and at the present time his condition is quite satisfactory.

He is now 68 years old and it has been nine years since he underwent a partial gastrectomy for carcinoma of the stomach. During that time several other types of malignancies have arisen and he has survived them all.

REPORT OF FOUR CASES OF UNILATERAL ECTOPIC KIDNEY

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WITH the advances made in urologic diagnostic methods during the past few years many anomalies of the upper urinary tract have been reported, such as unilateral, ectopic, crossed ectopic kidneys, horseshoe kidneys and double ureters.

The ectopic kidney is one which by reason of abnormal embryologic development does not occupy the normal renal position. This anomaly is rare in comparison with the common condition of acquired renal ptosis—from which it can easily be differentiated. The ectopic kidney may be perfectly normal in appearance or it may be moderately hypoplastic, lobulated, flattened and often moulded by pressure from neighboring organs or bony structure. In view of its congenital dislocation, its questionable ability to empty itself through the abnormally placed pelvis and ureter, such a kidney may become the site of disease. The following conditions are especially liable to develop—hydronephrosis, calculus formation, pyelonephritis. Some writers claim that at least 80 per cent of these kidneys are diseased.

The incidence of the anomaly has been estimated by Thomas and Barton as occurring in one out of every 822 autopsies, while clinically over a period of six years they found only one case in 547 urologic examinations.

Renal ectopia may be unilateral or bilateral and the displacement may be transverse or sagittal. In the transverse and bilateral types fusion may or may not occur.

The anomaly of renal ectopy occurs during the development of the metanephros or permanent kidney and is due to lack of growth of the ureter or the persistence of the early mesonephric or nutrient arteries to the developing kidney.

There are other anomalies that may occur in any maldevelopment so that absence or hypoplasia of the opposite kidney and genital effect on the same side as the renal ectopy are sometimes found.

There may be other peculiarities in these ectopic kidneys such as variations in the arterial and venous blood supply both as to the number of vessels going to the ectopic kidney and as to their origin.

In some cases as many as three or six arteries may enter the misplaced organ and they may arise from the aorta at or about the bifurcation or from the common or external iliac. They may arise on the side where the ectopic kidney should have developed or from the other side. The former origin is more usual.

Rarely the adrenal gland may wander across the midline with the displaced kidney though usually it remains undisturbed. In some cases—especially in women—there is a developmental disturbance in the internal generative organs. The right kidney seems to be more often the ectopic. In this series of cases reported the male was more prevalent.

The accurate diagnosis of this condition depends upon the combination of cystoscopy with opaque catheter and retrograde pyelography as well as upon excretory urography—which, as it becomes more familiar to us, we will probably discover many otherwise unsuspected cases of ectopia. Palpation of the abdomen may detect a mass and raise the suspicion of a retroperitoneal growth. Stone shadow in atypical position may suggest a renal deformity, but roentgenography will always be the final test and confirm the diagnosis. As seen in one of our cases the opaque catheter passes up a normally placed ureteral opening, the catheter making a sudden turn in the pelvis.

The use of the opaque catheter is sufficient to make the diagnosis. The pyelographic methods are necessary in a complete study of these cases to demonstrate the deformities of the pelvis and calyces, the presence of hydronephrosis and other pathologic conditions.

Excretory urography is sure to prove most useful in discovering these cases but the picture produced in the roentgen film will be less striking than those obtained with opaque catheters and retrograde pyelography.

If the ectopic kidney is diseased and not functioning well it is perfectly possible that no adequate delineation of the pelvis and ureter of the ectopic kidney in the intravenous pyelogram will be obtained, though the visualization of only one definite organ will naturally suggest the employment of a cystoscopic examination, the introduction of opaque catheter and retrograde pyelogram of the suspected kidney.

These kidneys are of some interest to the gynecologist because of their similarity to pelvic tumors. Recognition is quite rare when accompanied by a gynecologic condition and may lead to a mistaken diagnosis. For this reason its preoperative identification is of great

importance. In obstetrics the ectopic kidney may interfere with the descent of the fetus.

Intravenous and retrograde pyelograms should be made if the symptoms are suggestive of a kidney lesion. The ectopic kidney is always congenital.

Cases of renal ectopy may be classified in three groups. 1. Those which are symptomless and have normal function. 2. Those which give symptoms from pressure or interference with or by other organs in the vicinity. 3. Those which are the seat of the common pathologic lesion of the normally located kidney. Patients may complain of frequent urination, chills, fever, pain over the ectopic kidney, general malaise.

The treatment may be divided into palliative and surgical. The surgical treatment if the kidney is functionless and acting as a focus of infection should be nephrectomy—done retroperitoneally. When possible, if the kidney has good function and is not causing any symptoms it probably should be left alone. If the pedicle is long enough to justify anchoring the kidney this should be done to improve drainage and relieve pelvic infection. If hydronephrosis and infection is present and the patient refuses operation repeated ureteral catheterizations should be employed in conjunction with urinary antiseptics for the particular infection.

In the majority of cases due to the inability to improve the position of the displaced kidney by operation—to relieve infection or hydronephrosis nephrectomy will continue to be the operation of choice in the surgical treatment of a pathologically ectopic kidney. Nephrectomy was done in 3 of our cases and these patients were entirely relieved of symptoms.

REPORT OF CASES

CASE 1. Mrs. M. complained of pain in the lower abdomen, constipation, urinary disturbance, backache.

Physical examination was without interest except for tenderness and soreness over the urinary bladder and, on vaginal examination, a mass was felt in the pelvis. This mass was thought at first to be an ovarian cyst.

Urinalysis: specific gravity 1.019, a faint trace of albumin, a few epithelial cells, many pus cells. *B. coli* was cultured from the urine. Blood count: hemoglobin 80 per cent, red blood cells 4,560,000, leukocytes 7,550, lymphocytes 25, mononuclears 3, polymorphonuclears 72. Blood urea 14. Phenolsulphonphthalein test 70.

Intravenous pyelogram, five minutes and fifteen minutes and one half hour after the injection of the diodrast: the left kidney showed normal secretion

and normal outlines of the pelvis and calyces. The right kidney was not visualized at all: certainly there was no function of the right kidney.

Cystoscopic examination: normal bladder mucosa. Catheter was passed in right ureteral opening and cloudy urine drained off.

Retrograde pyelogram of the right kidney showed a twisted ureteral catheter in an ectopic pelvic kidney, situated in the level of the upper third of the sacrum. The kidney pelvis appeared larger than usual and U-shaped; no calyces could be distinguished. In correspondence with the findings of the intravenous pyelogram it seemed most likely that the right ectopic kidney had little or no function.

The patient refused nephrectomy.

CASE 2. B. C. complained of backache, chills, fever, loss of weight, soreness in lower abdomen, painful frequent urination.

There was marked tenderness and soreness over the urinary bladder; on rectal examination a mass in the pelvis could just be felt.

An intravenous pyelogram was done and fifteen minutes after the injection of the diodrast the right kidney could not be seen. There was an enlarged kidney pelvis with flattened calyces on the left side. Retrograde pyelogram of the right kidney showed an ectopic and hydronephrotic kidney in the level of the sacrum with a short ureter.

Urinalysis: specific gravity 1.007, a trace of albumin, a few epithelial cells, many pus cells, an occasional red cell. Blood count: hemoglobin 80 per cent, red blood cells 4,580,000, white blood cells 8,350; lymphocytes 28, basophils 3, polymorphonuclears 69. Blood urea 16 mg. Phenolsulphonphthalein 60.

A diagnosis of ectopic right kidney was made and removal of the kidney advised.

At operation, a right rectus incision was made over the mass, the peritoneum reflected inward, the kidney freed, the pedicle of the ectopic kidney clamped, ligated and cut and the kidney removed. There were two arteries coming from the common iliac. The ureter was short.

The patient's convalescence was uncomplicated, and recovery complete.

CASE 3. F. A., a colored man, entered the hospital complaining of acute abdominal pain and a mass in the right lower abdomen, which had been diagnosed as an appendiceal abscess. Temperature was 103. Physical examination was without interest except for a large mass in the right lower right abdomen.

Urinalysis: a trace of albumin and many pus cells.

The mass did not disappear after catheterization. Under a local anesthetic the mass was opened and a large quantity of purulent fluid evacuated. In a few hours the odor of urine was noted in the drainage. When the patient was better a pyelogram was made.

Flat plate of the abdomen showed a drainage tube fastened by a safety pin in the right half of the abdomen.

Five minutes after the intravenous injection of diodrast there was some initial secretion in the left but none in the right kidney.

After 15 minutes the left kidney was better visualized. After 45 minutes the left kidney showed an elongated but normally shaped pelvis. The left ureter and a small part of the medial third of the right ureter were visualized but in neither picture was any secretion in the right kidney to be seen. The bladder was slightly filled. Apparently the right kidney was without function, the left kidney normal.

Twenty cubic centimeters of sodium iodide was injected through the drainage tube. This showed a large and irregularly bordered sac at the level of the sacrum apparently not in connection with the bladder but a connection with the ureter or kidney could not be excluded.

A diagnosis of right ectopic hydronephrotic kidney was made and nephrectomy advised.

The scar of the previous operation was excised, the peritoneal cavity opened and the retroperitoneal layer was incised and dissected from around the kidney. The kidney was delivered, the pedicle clamped and doubly ligated. The closure was with drainage. The patient made an uneventful recovery and was completely relieved.

CASE 4. Mr. W. F. K., aged 46, complained of indigestion, constipation and low backache, at times difficulty in voiding. He was very excitable and nervous. There had been occasional elevations of temperature.

Urinalysis: specific gravity 1.022, a faint trace of albumin, occasional epithelial cells, a few pus cells. Blood count: hemoglobin 80 per cent, red blood cells 4,600,000, white blood cells 12,500; lymphocytes 33, mononuclears 2, polymorphonuclears 65. Blood urea 14.5. Phenolsulphonphthalein 70.

An intravenous and left retrograde pyelogram showed the following: Films were made 4, 10 and 25 minutes after the intravenous administration of skiodan. The four minute film showed excellent visualization of the right renal pelvis and ureter which were normal in appearance. The right kidney was large within normal limits. None of the films showed visualization of the left kidney pelvis but the pelvic portion of the left ureter was well visualized almost directly in the midline. Film projections of the left renal region demonstrated no kidney outline.

Retrograde left pyelographic examination showed the kidney pelvis opposite the first and second place of the sacrum, slightly more to the left than to the right. This pelvis was of bifid type, showing general enlargement of moderate degree and definite evidence of dilatation of minor calyces of the upper group. The upper calyces were directed laterally toward the left. Thus the hilum of the kidney was directed to the right and downward. The left ureter was short and not especially tortuous.

Diagnosis: Congenital ectopy of the left kidney with short ureter: the kidney had a bifid pelvis and there was evidence of a moderate degree of hydronephrosis. The right kidney was normal.

Operation was advised. A midline incision was made, the peritoneum over the left kidney incised, I was unable to deliver the kidney. The pedicle was identified, clamped, cut and ligated with No. 2 catgut. A small penrose drain was placed in the region where the kidney was located. The appendix was removed. A tube was brought out at the lower angle of the wound. Closure

with No. 2 catgut in peritoneum and fascia, silkworm gut for skin. Post-operative condition was good.

The patient made an uneventful recovery and was entirely relieved of symptoms.

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ARACHNIDISM

CASE REPORT OF ARACHNIDISM WITH DEATH AND AUTOPSY FINDING

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ARACHNIDISM is a clinical complex in man closely simulating an acute abdominal disease due to the poison from the bite of the *Latrodectus Mactans*, a poisonous spider of North America commonly known as the "Black Widow" or "Hourglass" spider. The *Latrodectus Mactans* is a small shiny black spider easily identified by means of a bright red hourglass mark on the under surface of the abdomen. The female is known as the "Black Widow" because she eats her mate and is the one responsible for the disease. The male does not bite. It is found in basements, in dark corners of barns or outhouses, dirty wood toilets, and under stones.

The clinical manifestations are those of an acute poison characterized by pain in the site of bite which rapidly spreads to the entire body, first to the regions near the bite and then to the chest, shoulders, arms, legs and abdomen. The pain in the chest and in abdomen is very intense. The abdomen becomes rigid and board-like. The pain in the region of the diaphragm and intercostal muscles is so intense the patient breathes with difficulty. There is a sensation of constriction around the chest and upper abdomen. The patient is restless and tosses about, turning on one side and then the other, and sometimes on all fours. The skin is cold and clammy. There is an expression of anguish and acute suffering. He is unable to locate the pain: he "hurts all over." The pulse and temperature may remain normal or may be subnormal. There is cyanosis late in the disease. The blood pressure is always elevated and there is a marked leukocytosis. There is usually urinary suppression and constipation.

No tender points can be elicited over the abdomen or any other part of the body. These symptoms usually last twelve to fifteen hours—beginning a few minutes after the bite, reaching the peak of intensity within ten hours, and subsiding inversely as they appeared. In case of death, the symptoms increase in intensity, finally terminating in convulsions and death within thirty-six hours.

There are more than eighty remedies listed in the treatment, none of which has very much effect on the disease, except the antivenom, which has been recently developed and is most effective.

Bogen of the Los Angeles General Hospital reviewed the literature in 1926 and stated that thirty-three physicians have reported 150 cases of spider bites during the past hundred years. At that

time only 10 deaths had been reported and no autopsy findings. A case is reported because I believe:

1. Arachnidism is more prevalent than literature records due (a) to the failure to report cases, (b) to failure in diagnosis, (c) to lack of appreciation of the disease as a clinical entity.
2. Death may be, and occasionally is, caused by the disease.
3. The disease when not diagnosed so closely mimics an acute surgical abdomen—often surgery is resorted to.
4. The treatment by antivenom early in the disease is effective, but late is of very little value.
5. An autopsy was obtained and autopsy findings are recorded for the first time reported in literature.

Informants: Mother and Father.*

HISTORY

For several days prior to admission to the hospital, R. L., a boy of 16, had not been feeling well, but had had no definite complaints. He continued to work and attend school until the morning of onset. At this time he developed nausea and vomiting and was unable to retain even water. He complained of intense pain over the whole abdomen extending upwards in both sides of the chest and radiating toward the back. He had pain in both legs, especially in the calf of the right leg.

Examination at this time by the attending physician revealed a young boy, very tall and under-weight, badly dehydrated, and calling for water. He had an anxious expression over the face and was very restless. T. subnormal. R. 44. Heart action: good. P. 125. Lungs: clear. Abdomen: very flat and rigid; no point tenderness. No increase in pain with pressure. Extremities: normal. Lips, tongue, mouth and throat: very dry, congested and red. Eyes: clear; both pupils dilated.

The pain increased, despite treatment, and the patient was admitted to the hospital at midnight. Examination at this time was essentially the same as on previous examination except for board-like rigidity of abdomen. No tenderness. T. 100 (R.). P. 144. R. 44. B. P. 140/90. Patient was very restless, pale, and in semi-coma. He exhibited moderate cyanosis of the finger tips and lips.

*The mother and father stated that the boy was a lover of collecting insects and that he had several Black Widow Spiders in his room at the time of the onset of his last illness and that one of the spiders had escaped from its jar in the bedroom. This information was given when asked if the boy had any peculiarities in his habits or hobbies.

LABORATORY

White blood cells 35,100. Neutrophils 81 per cent. Stabs 5 per cent. Total polys morphonuclears 86 per cent. Lymphocytes 14 per cent. Urine: Specimen not obtained.

COURSE IN HOSPITAL

The patient was given morphia gr. $\frac{1}{4}$ and atropine gr. $\frac{1}{150}$, 1000 c. c. normal saline with 2.5 per cent glucose, subcutaneously, was given. Following this, the patient improved slightly until 6 a. m. At this time his pulse was weak and rapid, 160. Respiration was loud and irregular. He was very restless. The fingers were cyanotic. Despite stimulation, the pulse became imperceptible, and the temperature rose to 106.4. At 8 a. m., he had a convulsion which lasted 2 or 3 minutes. Cyanosis increased, and the patient became rigid and stiff. He died at 8:50 a. m.

Autopsy Report by A. J. Ayers, M. D.

Male, fairly well developed and poorly nourished, apparently 15 or 16 years of age. There were no operative scars nor tumor masses about the body.

Abdomen: The abdominal wall was thin. On opening the abdominal cavity there was no free fluid noted. The stomach and intestines were in the normal position. The appendix was apparently normal. There was no pathology noted involving the stomach or the large and small intestines. There was moderate enlargement of the liver, soft, which on section shows congestion. The gallbladder was small, soft and filled with fluid. There were no stones. Both kidneys were in the normal position. On section the kidneys presented no gross pathology. The spleen showed slight enlargement. The pancreas was firm, no cysts, tumor masses nor pathology noted. The pelvis presented no pathology involving the urinary bladder, prostate or the rectum.

The heart and lungs were in the normal position with no free fluid in the chest cavity. There was crepitation throughout both lungs. The heart presented no increase in the pericardial fluid. The myocardium was apparently normal. No involvement of the aorta.

Cystern Puncture: There was approximately 10 c.c. of clear fluid obtained. The cell count was 210, mostly lymphocytes. Culture examination from the fluid showed no growth after 48 hours. Smear from fluid for tubercle bacilli showed no acid-fast organisms.

The head was not opened.

Anatomic Diagnosis: No gross pathology was found that could account for the patient's death. Arachnidism was given as a cause of death.

Microscopic Examination: Sections from the lymph nodes show fibrosis throughout with some destruction of the lymphoid tissue. Sections of the kidney show a swelling of the epithelial cells of the lining of the tubules and marked extravasation of the red blood cells throughout.

Microscopic Diagnosis: Chronic adenitis. Acute hemorrhagic nephritis.

Clinical Diagnosis: Arachnidism.

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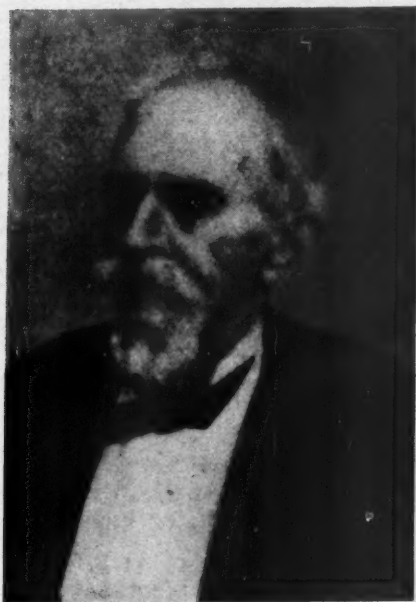
OCTOBER, 1942

NUMBER 10

DR. ASHBEL SMITH, TEXAS DIPLOMAT

In the vigorous development of Texas from an unimportant Spanish Colony, to a Mexican State, to an independent Republic, and finally to the largest state in the Union, the contemporary doctors played many worth while non-medical roles. Apart from their natural professional activities in their communities many of them showed eminence in public life, literature, military affairs, and other fields quite removed from medicine. Among these Dr. Ashbel Smith of Galveston, the calm intellectual political leader, probably accomplished more for the common good than any of his associates. Minister to the courts of France and England, Secretary of State of the Texas Republic, member of the Texas Legislature, Surgeon General of the Army of Texas, Regent of the University of Texas, President of the State Medical Association, author, and keen scientific observer are but his most widely known achievements. In a tumultuous lusty age on the raw Western frontier this retiring temperate scholar must have appeared unique.

Ashbel Smith was born in Hartford, Connecticut, Aug. 13, 1806 and was a descendant of the Seymour family of Connecticut and of the Massachusetts Adamses. He attended the elementary schools of his home city and Yale College from which he graduated in 1824. Afterward he moved to Salisbury, North Carolina, to begin "reading law." In less than a year he gave up the idea of the law and returned to Yale to study medicine. Upon completion of the medical course, he sailed to Europe to study in Paris under Louis, Gay-Lussac, Velpeau, and the other great teachers at the Hotel Dieu, Necker, and Hopital des Invalides. His diary records, among other things, experimental surgery on cadavers, rounds with Du-



ASHBEL SMITH, M. D. (1806-1886)

puytren and Baron Larrey "by candle light in the morning," Velpeau removing a tumor, and Lisfranc amputating a leg. A close friend and fellow student, Dr. James Jackson, Jr., of Boston was likewise enthralled with the magnificent opportunities for learning in this large medical center. During the cholera epidemic in 1832 these two young Americans courageously remained in Paris to study a disease "which will probably visit our hitherto untouched country."

Young Ashbel Smith the medical student saw much of Lafayette the aged marquis, he visited frequently in the home of James Fenimore Cooper then residing in Paris, and was well known in French literary circles. While in Paris he laid the permanent foundation for his later extraordinary intellectual and scientific development.

Upon his return to this country, Dr. Smith settled in Salisbury, North Carolina, where he had begun his career as a lawyer eight years before. He promptly published a pamphlet "The Cholera Spasmodica, as Observed in Paris in 1832, Comprising Its Symptoms, Pathology, and Treatment: Illustrated by Cases" which attracted wide attention since cholera had begun to appear in New York. From Boston, James Jackson wrote of "the rational views you have presented," Isaac Hays, editor of the *American Journal*

of the Medical Sciences, spoke of "your excellent paper on cholera," and many others praised the work highly.

Ashbel Smith practiced medicine in Salisbury for several years during which time he became deeply concerned with the struggle of the Texans to gain their freedom from Mexico. In the spring of 1837 after the fall of the Alamo and the Battle of San Jacinto, Dr. Smith closed his affairs in North Carolina and headed for the new Republic of Texas. He reached Galveston in June, 1837. His abilities were quickly recognized and he was soon appointed Surgeon General of the Army of the Texas Republic. In the spring of 1838 he was appointed with Dr. R. A. Irion, Secretary of State, to effect a treaty with the Comanche Indians. This first essay in diplomacy was so successful that for a long time the safety of the border settlements was assured. During this year, 1837, the young bachelor Ashbel Smith lived in the womanless menage of General Sam Houston where Marquis James says "wonderful stories were told of these full-toned carousals." Political advancement for Dr. Smith was not retarded by residing in the home of the most powerful public leader in Texas.

In December, 1838, Dr. Smith resigned from his position as Surgeon General of the Army and began the private practice of medicine in Galveston. Nine months later the first yellow fever epidemic appeared in Galveston and the medical men were overcome in their efforts to treat a malady about which they knew so little. Dr. Smith soon conceived a conservative plan of treatment based on venesection, free intake of fluids, good nursing and laudanum for restlessness. He later reported his observations in an 84 page monograph, "An Account of Yellow Fever Which Appeared in the City of Galveston, Republic of Texas, in the Autumn of 1839 with Cases and Dissections." In this thorough study 31 cases were reported with seven autopsies, and sound deductions were made which are still correct in the light of later increase in our knowledge.

By early 1842 the Texas Republic was in the desperate position of being ignored by the other nations while Mexico continued preparations to recapture the country. President Sam Houston sought eagerly to encourage the Powers to underwrite Texas independence and appointed Dr. Ashbel Smith as Minister to the courts of France and England. He was sent to apologize to the Government of France for a fight over a pig by the French Chargé d'affaires in Texas, M. de Saligny, and he was to complete a treaty of recognition with England which was being opposed by the antislavery party. Both these objects were duly achieved, Gallic ruffled feelings were calmed, England offered to persuade Mexico to recognize

Texas independence, and the English also agreed to stop preparation of naval vessels in England to assist the Mexican conquest.

Dr. Smith returned from Europe in the fall of 1844 and in February, 1845, was appointed Secretary of State of the Republic of Texas by the President, Dr. Anson Jones. In this capacity he completed the treaty of recognition of the Republic by Mexico but already the United States Congress was soliciting annexation. Dr. Smith was opposed to annexation and was burned in effigy in Galveston for his views. In April, 1845, Dr. Smith was sent again to France and England to explain how prospective annexation of Texas to the United States would nullify many of the diplomatic agreements which he had made such a short time before.

On his return the Mexican War was in progress and Dr. Smith joined the army of General Taylor in Mexico. After the war he was elected several times to the State Legislature from Harris County. In 1852 after Texas was a State in the Union, he was appointed chairman of a Board of Commissioners to inspect the West Point Military Academy.

During the Civil War, Dr. Smith served as colonel of the Second Regiment of the Texas Infantry. He was captured in the siege and surrender of Vicksburg and later, on being released, was commander of the defenses of Galveston. When the War was over and Texas became a Federal Military District, former Confederate officers were compelled to withdraw from public affairs. Dr. Smith therefore retired to his plantation at the head of Galveston Bay and prepared to devote his time to agricultural and literary pursuits while the state was being "Reconstructed."

In 1866, Dr. Smith again was elected to the State Legislature, in 1876 he was appointed as a judge at the U. S. Centennial Exposition, and in 1878 he was appointed as a commissioner to the Paris Exposition. In 1882 he served as president of the Texas State Medical Association, and about the same time he became one of the Regents of the University of Texas. He died Jan. 21, 1886, in his eightieth year, and was buried in the State Cemetery in Austin.

In addition to his scientific works, Ashbel Smith published many addresses and public papers such as "Notice sur la Geographie de Texas," Paris 1840, and "An Oration Pronounced Before the Phi Beta Kappa Society of Yale College," 1849, but he is best known to historians for his "Reminiscences of the Texas Republic" published in 1876. He was a member of several leading literary and scientific societies in this country and abroad and was widely recognized for his scholarly attainments.

Diplomatic skill, political leadership, literary ability, and scientific acumen were uncommon attainments among the frontier doctors in general. In Dr. Ashbel Smith, however, these qualities were so admirably combined that it is no wonder he ranked as one of the great leaders of Texas in his time.

WALTER STUCK, M.D.

San Antonio

TOTAL WARFARE AGAINST CANCER

The roll call of the "Captains of Death"—

1. Heart Disease.
2. Influenza and Pneumonia.
3. Cancer.
4. Kidney Disease.
5. Cerebral Hemorrhage.
6. Tuberculosis.
7. Diseases of Infancy.
8. Traffic Casualties.
9. War Casualties.

World War Number II is being fought on the plan of "Total Warfare." All resources of the belligerents and most of those of the neutrals, have been and are being utilized in combat. Military forces alone no longer fight wars. The civilian population is not only participating in the production of implements of war but is actually engaged in conflict.

The month of April has been designated cancer control month by the President of the United States. Forty thousand women of the Field Army, one hundred fifty thousand doctors and numerous government units are engaged in war against cancer. Progress is being made but this is not enough. There must be "Total Warfare" against this, one of the greatest enemies of man. There should be four hundred thousand women in the Womans Field Army and every month in the year should be cancer control month. The cancer control campaign must be carried to every hamlet, into every home and additional facilities must be secured if cancer is to be effectively controlled.

The cause of wars we are able to determine, but the cause of cancer is still a hidden mystery. Remove the cause of war and there will be no more wars. Remove the predisposing causes of cancer and cancer will be greatly minimized if not entirely eliminated.

PREDISPOSING FACTORS

We do not believe that cancer is inherited, neither do we believe that it is contagious. The present knowledge of its etiology is limited to so-called inherited tendencies, and predisposing factors. It may be due to evolutionary changes in the race or it may be due to a filtrable virus or it may be due to nutritional imbalance. Whatever the cause may be we know that its greatest activity occurs during the period of life of the individual when physiologic and metabolic activity are at their greatest height. It may make its

appearance any time during life from infancy to old age. From the second to the sixth decade of life it is most commonly seen. In the lactating breast its activity is greatest. In the prolific mother it finds its greatest number of victims. Why does fate exact such toll and impose such a penalty for motherhood? The womb and breast, the two organs most affected during the period of reproduction, are subjected to greater activity during pregnancy and lactation. Laceration and ulceration of the cervix we know predispose to cancer. Lactation we also know predisposes to the development of breast tumors.

It is definitely proven that snuff is a factor in the production of cancer of the mouth and that the sun's rays cause cancer of the hands and face. Cancer of the larynx and lungs is more common than before the days of cigarette smoking. The real cause of the growth and spread of cancer is cell activity. Irritation stimulates cell activity. This explains why cancer of the lip, tongue and cheek is common in snuff users, and pipe and cigarette smokers. The constant irritation of the pipe stem and the nicotine in the tobacco cause ulceration and cell activity and ultimately cancer.

SIGNS OF CANCER

The early signs of cancer on the exposed surfaces of the body are ulceration and tumor formation. Bleeding, discharge and pain are later symptoms. There are no signs of early cancer in the concealed portions of the body. Unfortunately when signs do appear the growth is usually far advanced. Our advice with reference to the early signs of cancer of the womb must be modified. It is not sufficient to advise women to go to their doctor for examination if they notice irregular bleeding or spotting and foul discharge. They must go before these signs appear if cancer would be discovered early enough for cure. Every married woman should have an examination at least twice yearly. Cancer of the breast begins as a single or minute group of cells. In the beginning this nodule is so small it is not noticed by the patient. Even the trained hand of the physician may not be able to feel the lump in time to save the life of the woman. Rarely is cancer of the stomach found in time. Only by the aid of the x-ray is cancer of this organ discovered in time to save the life of the patient.

TREATMENT

Is cancer curable? This question can be definitely answered only with reference to the time element. Is *early* cancer curable? Yes. Is *late* cancer curable? No. Why is this? Early cancer is local. That is, the cells at first are confined to a small or local area. This

local area can be destroyed and thus destroy the cancer cells, before they spread to other portions of the body. In late cancer the cells have already spread through the blood vessels, lymph channels or like the roots of a tree to other organs of the body. At this stage there is no known cure. How long do these cells remain local? We do not know. How do we know we have received treatment in time? Only by statistics on large numbers of cases treated at different stages and observed after treatment over long periods of time are we able to answer.

1. Cancer of the mouth when treated early is curable in 80 per cent of cases. When treated late only 20 per cent are curable.
2. Cancer of the breast is curable in 75 per cent of the cases when treated early. When treated late only 20 per cent of patients live.
3. Treatment early in cancer of the uterus cures 80 per cent but when treated late only 10 per cent are curable.
4. Ninety-five per cent of the cases of cancer of the skin are curable when treated early. When treated late, 30 per cent are curable.

What are the known remedies that will cure cancer? Surgery, x-ray, radium and cautery are the accepted methods employed in the treatment of cancer. They are effective only in proportion to the time of application and the skill with which they are used. For any method to be effective the lesion must be treated early, and the entire local area must be destroyed, whether it be cut out or burned out.

What evidence have we that progress is being made? In 1920 the average elapsed time between the appearance of early symptoms of cancer and the institution of treatment was 11 months and 7 days. In 1940 the time was 4 months and 4 days. During the same period of time the number of five year cures increased 30 per cent. During the past few years cancer clinics have been established over the country. Also in some places cancer prevention clinics are in operation. In one of these clinics 600 people were examined during a three year period and 10 per cent were found to have cancer, of which 98 per cent were early and curable. At the present time one hundred fifty thousand people die annually of cancer. Of this number one hundred twenty thousand could be saved if the diagnosis were made early and appropriate treatment instituted. Every form of cancer is being studied throughout the nation as it has never been studied before. Many state legislatures are appropriating funds in an effort to make treatment available to those in need. Every doctor stands ready to answer the call to arms. It is an historic fact that

the women of our country have joined with the men engaged in warfare to make more effective war against the enemy. Today we are engaged in a battle not with saber and guns, but with science, skill and education. We are asking all forces to join with us in the hope that we may be able to plant a white flag on every door step of every home in this land to the end that cancer wherever found may be definitely destroyed. *And we shall not be satisfied to stop there. Our fight must be carried to the school, to the social and civic clubs, to the churches and to the law maker, to the end that the incidence of cancer may approach the vanishing point.*

PORTRAITS OF EARLY MEDICAL HEROES PRESENTED

On Sept. 8, 1942, Ciba Pharmaceutical Products, Inc., presented to the Surgeons General of the Army and Navy portraits of early medical heroes. The studies, in which the artist was aided by Colonel Harold W. Jones, M.D., librarian, Army Medical Library, and Captain Louis H. Roddis, M.D., of the Navy, editor of the Naval Medical Bulletin, were reconstructed from all available early sketches and prints. The paintings of these men who helped to found the medical services of both branches of the armed forces were done by Ishmael. Backgrounds for the paintings were suggestive of the exploits of the subjects:

William Paul Crillon Barton (1786-1856), the first Chief of the Bureau of Medicine and Surgery of the Navy.

Jonathan M. Foltz (1810-1877), Chief of the Bureau of Medicine and Surgery and Surgeon General, U. S. Navy.

Elisha Kent Kane (1820-1857), Medical Officer of the U. S. Navy.

Charles S. Tripler (1806-1866), Brigadier General, Army Medical Corps.

Jonathan Letterman (1824-1872), Surgeon Major, U. S. Army.

Bernard J. D. Irwin (1830-1917), Brigadier General, Army Medical Corps.

Together these men form a body of scientific pioneers who helped to establish the medical services of the Army and Navy and make them the great organizations for the saving of lives they are today. Barton standardized medical supplies, made of the crude sick bay a hospital and was responsible for placing a medical library in each unit. Foltz, known as Surgeon of the Seas because of his wide service, saw the transition from wooden ships to iron ones and forwarded in many ways the development of hygiene in the Navy. Kane headed an expedition into the Arctic to seek a missing brother officer and during that trip added much to our knowledge of the treatment of scurvy.

The presentation of the portraits of the Navy heroes was made to Rear Admiral Charles M. Oman, M.D., U. S. Navy, at the new National Naval Medical Center at Bethesda, Maryland, where the portraits will be hung in the library. In accepting the portraits Admiral Oman expressed the appreciation of the Navy Medical Service in the name of the Surgeon General of the Navy and remarked that he hoped that the young medical men who were coming into the service in the present conflict would be inspired by these portraits to live up to the traditions of these earlier Surgeons General of the Navy.

The presentation of the portraits of the Army Surgeons General was made in the stately old Army Medical Library. This Library contains many handsome portraits of past officers of the Army Medical Service: the three new ones will be added to the collection. Colonel Harold W. Jones, Medical Corps, U. S. Army, said in acceptance:

In accepting the portraits of Jonathan Letterman, Charles S. Tripler, and Bernard J. D. Irwin on behalf of the Surgeon General of the Army, I desire to express our appreciation of the gift made by the Ciba Corporation to the Army Medical Library. It is fitting on this occasion to say a few words concerning the lives of these men; they may perhaps help to impress upon the present generation the value of contributions to the Medical Department of

the Army and to humanity, which were made by these heroes of a day long past.

In his history of the Medical Department, Ashburn says that one of the wisest acts of Surgeon General Hammond was his choice of Assistant Surgeon Jonathan Letterman to be Medical Director of the Army of the Potomac. It is not too much to say that this selection made on June 19, 1862, just eighty years ago, marked a turning point in the care of the wounded in warfare.

Letterman proved a genius in the field, and without delay he introduced system, order and efficiency into the evacuation of the wounded. He established the first Ambulance Corps which was tested during the bloody battle of Fredericksburg, and became standard practice in the Union Army. His scheme of ambulance and field evacuation was studied, and much of it was copied, by the Army of every civilized nation.

Although during his lifetime Letterman was denied the acclaim which came to him long after his death, which occurred at the early age of 48, his fame is great today. Letterman General Hospital in San Francisco is named in his honor.

Charles S. Tripler, whose fame in the field of military medicine was outshone by that of Letterman, nevertheless was a man of great talents and during his lifetime he was held in the highest esteem. Perhaps his chief claim to greatness was his production of a system of examination of recruits. The manual he wrote was known as Tripler's Manual and in its various editions it was in use in the Army for scores of years. It was long the Bible of the recruiting service, and it is still the basis of our standardization of the new Army men.

General Tripler was born in the early years of the 19th century, graduating at the College of Physicians and Surgeons in New York in 1827. He declined a position in the Honorable East India Company in favor of an appointment to the Medical Staff of the Army.

Tripler was one of the best known medical officers in the Army. He was a great student, an excellent mathematician and a fine linguist.

Upon General Tripler's death, the Adjutant General of the Army published official notice in general orders praising his work in the Seminole War, the War with Mexico, the Occupation of California, and as Medical Director of the Army of the Potomac. His memory is perpetuated by Tripler General Hospital. No satisfactory portrait of him has ever come to our knowledge and the painting accepted today is therefore doubly appreciated.

General Irwin was born in 1830.

We have documentary proof that at the battle of Shiloh he established the first field tent hospital ever used in war. This attracted the attention of many foreign nations and tent hospitals were soon adopted by the armies of the world, Irwin's serving as a model for field hospitals ever since. The site of his original hospital is marked with a Government tablet. He spent many years in the Southwest in Indian campaigns, he even led troops in action and he performed surgical operations in the field under the worst possible conditions.

For distinguished bravery in action against the Indians he received the first Congressional Medal of Honor ever issued. He was a versatile writer and explorer, as well as a doctor. General Irwin died in his 87th year after a life full of adventures and honors. Seldom is such a career destined for a disciple of Aesculapius.

PROGRAM OF
THE TEXAS SURGICAL SOCIETY
OCTOBER 5, 6, 1942

MONDAY, OCTOBER 5—9:00 A. M.

Plastic Repair of the Lips from the Cosmetic Standpoint....T. G. BLOCKER
Emergency Medical Service in Civilian Defense.....W. B. RUSS
Abdominal Distention in Surgical Patients and Its
ManagementA. O. SINGLETON
The Problem of the Pilonidal Cyst in the Army..LT. COL. BRADLEY COLEY
Retroperitoneal Tumors.....E. P. BUNKLEY

ARMY PROGRAM AT BROOKE GENERAL HOSPITAL
(formerly Station Hospital)

FORT SAM HOUSTON

2:00 P. M. MEDICAL SERVICE

SCHOOL AUDITORIUM

The Brooke General Hospital.....COL. GEORGE C. BEACH
Commanding Officer

The Surgical Service of the Brooke General

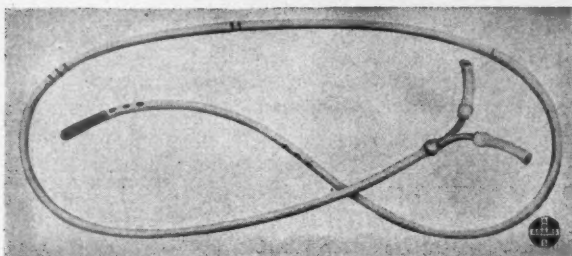
Hospital.....LT. COL. JOHN C. BURCH
A Routine for Examination of the Back.....MAJOR P. M. GIRARD
Rupture of Intervertebral Discs.....CAPT. R. C. L. ROBERTSON
Treatment of Chronic Synovitis of the Knee.....CAPT. E. P. LEGG
Appendicitis in the Army.....MAJ. H. C. FISHER
The Management of Hernia.....MAJ. D. J. AUSTIN
Operation for Hemorrhoids.....CAPT. T. E. SMITH
Surgical Treatment of Pilonidal Sinus.....CAPT. J. A. WALL
Hazards of Spinal Anesthesia...MAJ. J. W. WINTER, MAJ. L. H. MOUSEL

PROGRAM

TUESDAY, OCTOBER 6, 9:00 A. M.

Plasma In Surgery: Its Method of Preparation and Storage...W. C. TENERY
Cervical Ribs.....G. D. MAHON
Surgical Aspects of Black Widow Spider Bite.....K. H. AYNESWORTH
LT. COL. WALTER BAUER
The Surgical Treatment of Gastro-Jejunal Ulcer.....G. R. ENLOE

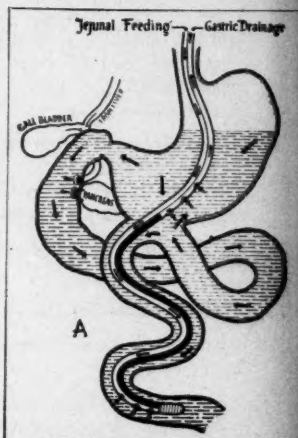
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